BASIN MANAGEMENT ACTION PLAN

for the Implementation of Total Maximum Daily Loads for Nutrients and Dissolved Oxygen

Adopted by the Florida Department of Environmental Protection

in the

Middle St. Johns River Basin

for

Lake Harney, Lake Monroe, Middle St. Johns River, and Smith Canal

developed by the
Lakes Harney and Monroe and Middle St. Johns River Basin Technical Stakeholders

in cooperation with the
Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration
Bureau of Watershed Restoration
Tallahassee, Florida 32399

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BMAP	Basin Management Action Plan
BMP	Best Management Practice
C.F.R.	Code of Federal Regulations
DO	Dissolved Oxygen
EPA	U. S. Environmental Protection Agency
ERP	Environmental Resource Permit
F.A.C.	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
F.S.	Florida Statutes
FWRA	Florida Watershed Restoration Act
FYN	Florida Yards and Neighborhoods
GIS	Geographic Information System
HSPF	Hydrologic Simulation Program – FORTRAN (model)
IWR	Impaired Surface Waters Rule
LID	Low Impact Development
LIDAR	Light Detection and Ranging
LCI	Lake Condition Index
LVI	Lake Vegetation Index
MGD	Million Gallons per Day
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
MSJR	Middle St. Johns River
NELAC	National Environmental Laboratory Accreditation Council
NELAP	National Environmental Laboratory Accreditation Program
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
OAWP	Office of Agricultural Water Policy
POTW	Publicly Owned Treatment Works
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RSF	Regional Stormwater Facility
SCI	Stream Condition Index
SJRWMD	St. Johns River Water Management District
SOP	Standard Operating Procedure
STORET	STOrage and RETrieval (Database)
SWMP	Stormwater Management Program
TKN	Total Kjeldahl nitrogen
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
UF-IFAS	University of Florida – Institute of Food and Agricultural Sciences
USGS	U.S. Geological Survey
WBID	Waterbody Identification
WLA	Wasteload Allocation
WWTF	Wastewater Treatment Facility

EXECUTIVE SUMMARY

THE LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN

The Lakes Harney and Monroe and Middle St. Johns River (MSJR) Basin includes the main stem segments of the MSJR located between the inlet of Lake Harney and the confluence of the St. Johns River with the Wekiva River. These river segments receive discharges from the Upper St. Johns River and from several major tributaries, including the Econlockhatchee River, Deep Creek, and Lake Jesup. These river segments are impaired for nutrients and two major lakes, Lake Monroe and Lake Harney, are also impaired segments of the MSJR main stem. The basin encompasses portions of Seminole County and Volusia County and areas within the cities of DeBary, DeLand, Deltona, Lake Helen, Lake Mary, Orange City, and Sanford.

The Smith Canal watershed is located in the southern portion of the Lakes Harney and Monroe and MSJR Basin and drains an area of about 10 square miles. Smith Canal is approximately 6 miles in length and flows northwest until it enters the St. Johns River approximately 1.4 miles upstream of the outlet to Lake Monroe. The Smith Canal watershed includes portions of Seminole County, Lake Mary, and Sanford.

TOTAL MAXIMUM DAILY LOADS

Total Maximum Daily Loads (TMDLs) are water quality targets, based on state water quality standards, for specific pollutants (such as nitrogen and phosphorus). The Florida Department of Environmental Protection (FDEP) identified the Lakes Harney and Monroe and MSJR Basin to be impaired by nutrients and low dissolved oxygen (DO) and, in October 2009, adopted Rule 62-304.505 establishing TMDLs for total phosphorus (TP) and total nitrogen (TN) for the lakes and river segments. The Smith Canal TMDL was adopted by FDEP in October 2009 for TP. The table below lists the TMDLs and pollutant load allocations adopted by rule for each of the impaired waterbody identification (WBID) numbers in the Lakes Harney and Monroe and MSJR Basin.

TABLE ES-1: TMDLS IN THE LAKES HARNEY AND MONROE AND MSJR BASIN

WBID NUMBER	WBID NAME	PARAMETER	TMDL (LBS/YR)	WLA NDPES WASTEWATER (LBS/YR)	WLA NPDES STORMWATER (%)	LOAD ALLOCATION (LBS/YR)
2964A	Lake Harney	TN	3,355,570	0	39%	3,355,570
2964A	Lake Harney	TP	241,026	0	33%	241,026
2964 + 2893F	St. Johns River Downstream of Lake Harney + St. Johns River Above Lake Jesup	TN	3,741,990	0	37%	3,741,990
2964 + 2893F	St. Johns River Downstream of Lake Harney + St. Johns River Above Lake Jesup	TP	276,141	0	32%	276,141
2893D + 2893E	Lake Monroe + St. Johns River Above Lake Monroe	TN	4,171,255	0	38%	4,171,255
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WBID Number	WBID Name	Parameter	TMDL (lbs/yr)	WLA NDPES Wastewater (lbs/yr)	WLA NPDES Stormwater (%)	Load Allocation (lbs/yr)
2893C	St. Johns River Above Wekiva River	TP	318,236	2,345	31%	315,891
2962	Smith Canal	TP	4,300	0	26%	26%

The Lakes Harney and Monroe and MSJR Basin Management Action Plan

The purpose of this BMAP is to implement TN and TP reductions for the Lakes Harney and Monroe and MSJR Basin to achieve the TMDLs. Since the Smith Canal watershed is located mostly within the Lakes Harney and Monroe and MSJR watershed, reductions made to achieve the Lakes Harney and Monroe and MSJR TMDLs should also address the Smith Canal TMDL. As a first step, the BMAP applies the reductions required for the Lakes Harney and Monroe and MSJR Basin to the Smith Canal watershed. If water quality improvements are not observed in Smith Canal over the next 5 years, more focused reductions in that watershed may be required.

The BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, Florida Statutes (F.S.). The management actions and adaptive management approach described in the BMAP will address nutrient reductions and the process will continue until the TMDLs are attained. The phased BMAP approach allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the watershed. The total required reductions from the TMDLs are spread over a 15-year timeframe. This BMAP addresses 50% of the allocated reductions over a 5-year period. After the first 5 years of BMAP implementation, stakeholders will evaluate progress and make adjustments, as needed, to meet the TMDLs, and a second BMAP will be developed to address the next portion of the reductions for the second 5-year iteration.

An important consideration for the restoration of the Lakes Harney and Monroe and MSJR Basin waters is that the majority of the loading to the impaired waterbodies comes from sources outside the watershed. Approximately 96.4% of the TN loading and 95% of the TP loading enters the impaired waterbodies from the Upper St. Johns River, Econlockhatchee River, and Lake Jesup basins. Therefore, implementing projects in the watershed alone will not achieve the TMDLs; reductions from the upstream sources must occur before water quality standards can be met in the impaired WBIDs.

Key Elements of the BMAP

This BMAP addresses the key elements required by the Florida Watershed Restoration Act (FWRA), Chapter 403.067, F.S., including the following:

- *Document how the public and other stakeholders were encouraged to participate or participated in developing the BMAP (**Section 1.3.1** and **Appendix C**);*
- *Equitably allocate pollutant reductions in the basin (**Chapter 4**);*
- *Identify the mechanisms by which potential future increases in pollutant loading will be addressed (**Section 1.5**);*
- *Document management actions/projects to achieve the TMDLs (**Chapter 5** and **Appendix E**);*
- *Document the implementation schedule, funding, responsibilities, and milestones (**Appendix E**); and*
- *Identify monitoring, evaluation, and a reporting strategy to evaluate reasonable progress over time (**Section 6.1**).*

ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

With implementation of the projects outlined in this BMAP, reductions in the TN and TP loads to Lakes Harney and Monroe and MSJR Basin are expected to improve water quality conditions. The following outcomes are expected from BMAP implementation:

- *Improved water quality trends in the watershed tributaries and Smith Canal;*
- *Decreased loading of the target pollutants (TN and TP);*
- *Increased coordination between state and local governments and within divisions of local governments in problem solving for surface water quality restoration;*
- *Determination of effective projects through the stakeholder decision-making and priority-setting processes;*
- *Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions; and*
- *Enhanced understanding of basin hydrology, water quality, and pollutant sources.*

BMAP COSTS

Costs were provided for 17% of the activities identified in the BMAP, with an estimated total cost of more than $22.4 million. In addition, annual operation and maintenance costs were provided for 10% of the projects for a total of $225,000. It is important to note that many of the BMAP projects were built to achieve multiple objectives, not just nutrient reduction; therefore, this should be a consideration when estimating a cost per pound of nutrient removal from these projects. The funding sources range from local contributions to legislative appropriations. Technical stakeholders will continue to explore new opportunities for funding assistance to ensure that the activities listed in this BMAP can be maintained at the necessary level of effort.

BMAP FOLLOW-UP

FDEP will work with the technical stakeholders to organize the monitoring data and track project implementation. The results will be used to evaluate whether the plan is effective in reducing nutrient loads in the watershed. The technical stakeholders will meet at least every 12 months after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues.

COMMITMENT TO BMAP IMPLEMENTATION

The stakeholders have committed to implementing the projects and activities included in this BMAP. The entities are also providing to FDEP, as needed, letters of commitment or resolutions of support to ensure that as staff and board members change over time, the entity has a way to show support for the BMAP and the efforts included.

CHAPTER 1: CONTEXT, PURPOSE, AND SCOPE OF THE PLAN

1.1 WATER QUALITY STANDARDS AND TOTAL MAXIMUM DAILY LOADS

Florida's water quality standards are designed to ensure that surface waters can be used for their designated purposes, such as drinking water, recreation, and shellfish harvesting. Currently, most surface waters in Florida, including those in the Middle St. Johns River (MSJR) Basin, are categorized as Class III waters, which mean they must be suitable for recreation and must support the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. **Table 1** shows other designated use categories.

Under Section 303(d) of the federal Clean Water Act, every two years each state must identify its "impaired" waters, including estuaries, lakes, rivers, and streams, that do not meet their designated uses and are not expected to meet applicable water quality standards within the subsequent two years. The Florida Department of Environmental Protection (FDEP) is responsible for developing this "303(d) list" of impaired waters.

TABLE 1: DESIGNATED USE ATTAINMENT CATEGORIES FOR FLORIDA SURFACE WATERS

* Class I and II waters include the uses of the classifications listed below them.
** Surface water classification for waters in the MSJR Basin.

CATEGORY	DESCRIPTION
Class I*	Potable water supplies
Class II*	Shellfish propagation or harvesting
Class III**	**Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife**
Class IV	Agricultural water supplies
Class V	Navigation, utility, and industrial use (*no current Class V designations*)

Florida's 303(d) list identifies hundreds of waterbody segments that fall short of water quality standards. The three most common water quality concerns are nutrients, oxygen-demanding substances, and coliforms. The listed waterbody segments are candidates for more detailed assessments of water quality to determine whether they are impaired according to state statutory and rule criteria. FDEP develops and adopts Total Maximum Daily Loads (TMDLs) for the waterbody segments it identifies as impaired. A TMDL is the maximum amount of a specific pollutant that a waterbody can assimilate while maintaining its designated uses.

The water quality evaluation and decision-making processes for listing impaired waters and establishing TMDLs are authorized by Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act (FWRA), and contained in Florida's Identification of Impaired Surface Waters Rule (IWR), Rule 62-303, Florida Administrative Code (F.A.C.). The impaired waters in the Lakes Harney and Monroe and MSJR Basin are Class III waters. TMDLs have been established for these waters, identifying the amount of total nitrogen (TN) and total phosphorus (TP) they can receive and still maintain Class III designated uses.

TMDLs are developed and implemented as part of a watershed management cycle that rotates through the state's 52 river basins every 5 years (see **Appendix A**) to evaluate waters, determine impairments, and develop and implement management strategies to restore impaired waters to their designated uses. **Table 2** summarizes the five phases of the watershed management cycle.

TABLE 2: PHASES OF THE WATERSHED MANAGEMENT CYCLE

PHASE	ACTIVITY
Phase 1	Preliminary evaluation of water quality
Phase 2	Strategic monitoring and assessment to verify water quality impairments
Phase 3	Development and adoption of TMDLs for waters verified as impaired
Phase 4	Development of management strategies to achieve the TMDL(s)
Phase 5	Implementation of TMDL(s), including monitoring and assessment

1.2 TMDL IMPLEMENTATION

Rule-adopted TMDLs may be implemented through Basin Management Action Plans (BMAPs), which contain strategies to reduce and prevent pollutant discharges through various cost-effective means. During Phase 4 of the TMDL process, FDEP and the affected stakeholders in the various basins jointly develop BMAPs or other implementation approaches. A basin may have more than one BMAP, based on practical considerations. The FWRA contains provisions that guide the development of BMAPs and other TMDL implementation approaches. **Appendix B** summarizes the statutory provisions related to BMAP development.

Stakeholder involvement is critical to the success of the TMDL Program, and varies with each phase of implementation to achieve different purposes. The BMAP development process is structured to achieve cooperation and consensus among a broad range of interested parties. Under statute, FDEP invites stakeholders to participate in the BMAP development process and encourages public participation to the greatest practicable extent. FDEP must hold at least one noticed public meeting in the basin to discuss and receive comments during the planning process. Stakeholder involvement is essential to develop, gain support for, and secure commitments to implement the BMAP.

1.3 THE LAKES HARNEY AND MONROE AND MSJR BASIN MANAGEMENT ACTION PLAN

1.3.1 STAKEHOLDER INVOLVEMENT

In October 2010, FDEP initiated BMAP technical meetings involving key stakeholders. The purpose of the technical meetings was for stakeholders to gather information to aid in the development of the BMAP and to identify management actions to improve water quality. In addition, FDEP periodically held policy briefings to obtain feedback on the BMAP process from the policy makers from each of the responsibility entities. The first policy briefing was held in November 2011.

Except as specifically noted in subsequent sections, this BMAP document reflects the input of the technical stakeholders, along with public input from workshops and meetings held to discuss key aspects of the TMDL and BMAP development. **Appendix C** provides further details.

1.3.2 PLAN PURPOSE AND SCOPE

The purpose of this BMAP is to implement TN and TP reductions for the Lakes Harney and Monroe and MSJR Basin to achieve the TMDLs. The plan outlines specific actions and an implementation schedule for load reductions. This BMAP also details a monitoring approach to measure progress toward meeting the nutrient load reductions. The stakeholders will meet at least annually to review progress made towards achieving the TMDLs.

FDEP adopted nutrient and dissolved oxygen (DO) TMDLs for the Lakes Harney and Monroe and MSJR Basin, including Smith Canal. Since Smith Canal is located mostly within the Lakes Harney and Monroe and MSJR watershed, reductions made to achieve the Lakes Harney and Monroe and MSJR TMDLs should also address the Smith Canal TMDL. Therefore, the Smith Canal watershed was included as part of this BMAP and initial reductions to achieve the Smith Canal TMDL are based on the reductions needed for the overall Lakes Harney and Monroe and MSJR Basin.

The Lakes Harney and Monroe and MSJR TMDL includes the impaired main stem segments of the MSJR located between the inlet of Lake Harney and the confluence of the St. Johns River with the Wekiva River. These river segments receive discharges from the Upper St. Johns River and from several major tributaries, including the Econlockhatchee River, Deep Creek, and Lake Jesup. Two major lakes, Lake Monroe and Lake Harney, are also impaired segments of the MSJR main stem. The basin encompasses portions of Seminole County and Volusia County and areas within the cities of DeBary, DeLand, Deltona, Lake Helen, Lake Mary, Orange City, and Sanford.

Smith Canal is located in northwest Seminole County and drains an area of about 10 square miles. Smith Canal is approximately 6 miles in length and flows northwest until it enters the St. Johns River approximately 1.4 miles upstream of the outlet to Lake Monroe. The Smith Canal watershed includes portions of Seminole County, Lake Mary, and Sanford.

Figure 1 shows the watershed included in this BMAP.

1.3.3 BMAP Approach

This BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, F.S. The management actions and adaptive management approach described in the BMAP will address nutrient reductions and the process will continue until the TMDLs are attained. The phased BMAP approach allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the watershed. The total required reductions for the Lakes Harney and Monroe and MSJR watershed from the TMDLs are spread over a 15-year timeframe. This BMAP addresses 50% of the allocated reductions over a 5-year period. These reductions are only for the sources within the watershed; additional reductions will be needed from upstream sources to achieve the TMDLs (refer to **Section 1.4**). After the first 5 years of BMAP implementation, stakeholders will evaluate progress and make adjustments, as needed, to meet the TMDLs, and a second BMAP will be developed to address the next portion of the reductions for the second 5-year iteration.

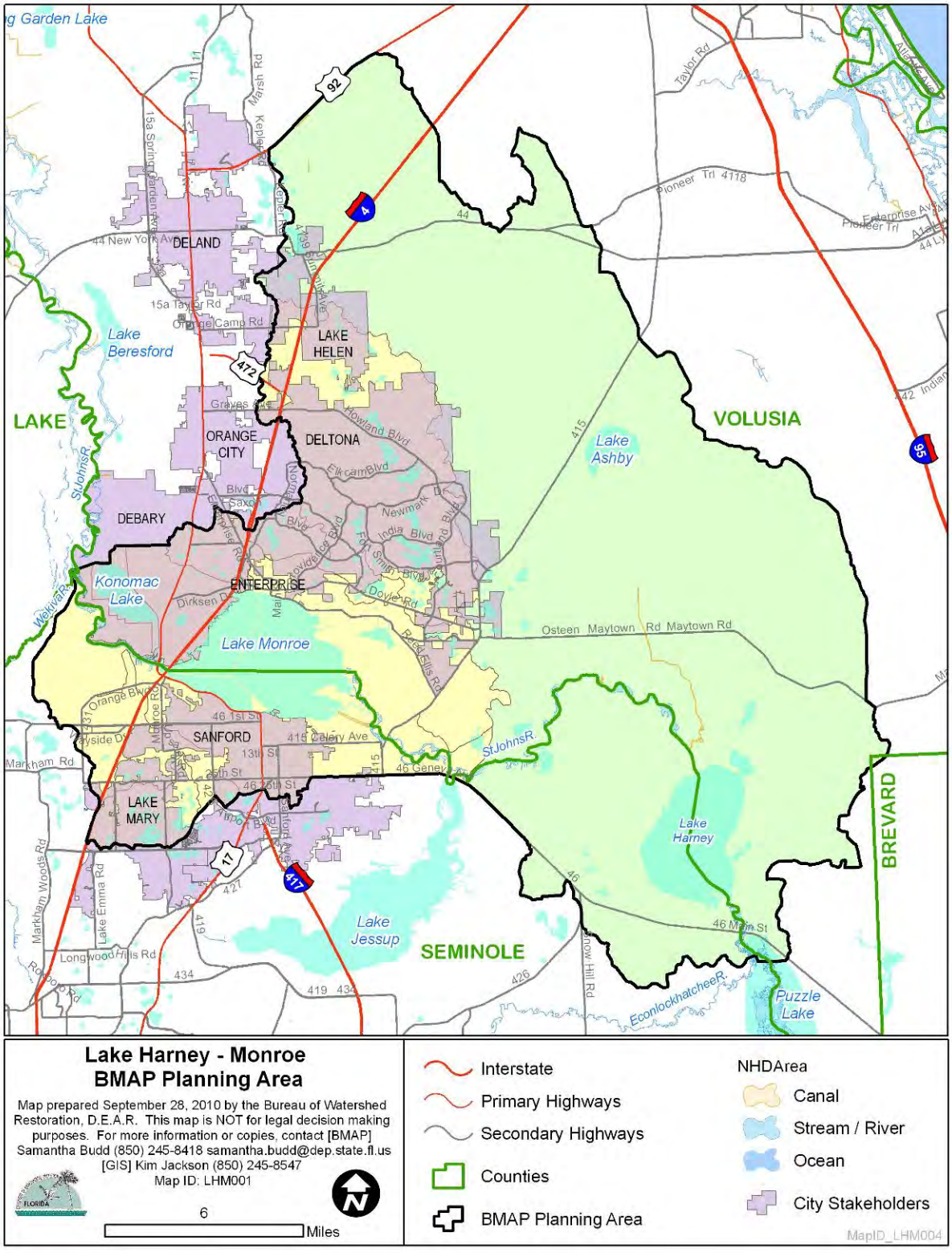

FIGURE 1: LAKES HARNEY AND MONROE AND MSJR BASIN

1.3.4 Pollutant Reduction and Discharge Allocations

1.3.4.1 Categories for Rule Allocations

The rules adopting TMDLs must establish reasonable and equitable allocations that will alone, or in conjunction with other management and restoration activities, attain the TMDL. Allocations may be to individual sources, source categories, or basins that discharge to the impaired waterbody. The allocations in rule identify either how much pollutant discharge in pounds per year (lbs/yr) each source designation may continue to contribute (discharge allocation), or the lbs/yr or percent of its loading the source designation must reduce (reduction allocation). Currently, the TMDL allocation categories are as follows:

- *Wasteload Allocation (WLA) – The allocation to point sources permitted under the National Pollutant Discharge Elimination System (NPDES) Program includes the following:*
  - **Wastewater Allocation** is the discharge allocation to industrial and domestic wastewater facilities.
  - **NPDES Stormwater Allocation** is the allocation to NPDES stormwater permittees that operate municipal separate storm sewer systems (MS4s). These permittees are treated as point sources under the TMDL Program.
- *Load Allocation is the allocation to nonpoint sources, including agricultural runoff and stormwater from areas that are not included in an MS4 permit.*

1.3.4.2 Initial and Detailed Allocations

Under the FWRA, the TMDL allocation in rule may be an "initial" allocation among point and nonpoint sources. In such cases, the "detailed" allocation to specific point sources and specific categories of nonpoint sources must be established in the BMAP. The FWRA further states that the BMAP may make detailed allocations to individual "basins" (i.e., sub-basins) or to all basins as a whole, as appropriate. Both initial and detailed allocations must be determined based on a number of factors listed in the FWRA, including cost-benefit, technical and environmental feasibility, implementation timeframes, and others (see **Appendix B**).

1.3.5 TMDLs in the Lakes Harney and Monroe and MSJR Basin

The TMDLs for the Lakes Harney and Monroe and MSJR Basin were adopted by FDEP in December 2009, and the TMDL for Smith Canal was adopted in September 2009. For assessment purposes, FDEP has divided the Lakes Harney and Monroe and MSJR Basin into water assessment polygons with unique waterbody identification (WBID) numbers for each watershed or segment. **Table 3** lists the TMDLs and pollutant load allocations adopted by rule for each of the impaired WBIDs in the Lakes Harney and Monroe and MSJR Basin.

TABLE 3: TMDLS IN THE LAKES HARNEY AND MONROE AND MSJR BASIN

WBID NUMBER	WBID NAME	PARAMETER	TMDL (LBS/YR)	WLA NDPES WASTEWATER (LBS/YR)	WLA NPDES STORMWATER (%)	LOAD ALLOCATION (LBS/YR)
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WBID Number	WBID Name	Parameter	TMDL (lbs/yr)	WLA NDPES Wastewater (lbs/yr)	WLA NPDES Stormwater (%)	Load Allocation (lbs/yr)
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1.4 Assumptions and Considerations Regarding TMDL Implementation

The water quality impacts of BMAP implementation are based on several fundamental assumptions about the parameters targeted by the TMDLs, modeling approaches, waterbody response, and natural processes. In addition, there are important considerations about the nature of the BMAP and its long-term implementation.

This BMAP requires stakeholders to implement their projects within the specified time period to achieve reductions. However, the full implementation of this BMAP will be a long-term process, adaptively managed in 5-year cycles. While some projects and activities contained in the BMAP were previously completed or are currently ongoing, multiple projects require time for design, permitting, construction, and to secure funding. While monies to fund the projects could be an issue, funding limitations do not affect the requirement that every entity must implement the activities committed to in the BMAP that are needed to achieve the required reductions in the first iteration.

Since BMAP implementation is a long-term process, the TMDL targets established for the Lakes Harney and Monroe and MSJR Basin will not be achieved in the first 5-year cycle. Regular follow up and continued coordination and communication by the stakeholders is essential to ensure the implementation of management strategies and assessment of their incremental benefits. Additional management actions required to achieve TMDLs, if necessary, will be developed as part of future BMAP iterations.

During the BMAP process, several items were identified that should be addressed in future watershed management cycles to ensure that future BMAPs use the most accurate information:

- *Upstream contributions to the impaired waterbodies – The majority of the loading to the impaired waterbodies in the Lakes Harney and Monroe and MSJR Basin comes from sources outside the watershed. Approximately 3.6% of the TN loading and 5.0% of the TP loading is generated from internal watershed inputs, atmospheric deposition onto the impaired waterbodies, and the one wastewater treatment facility (WWTF) in the watershed. The vast majority of the loading (96.4% of the TN loading and 95% of the TP*

loading) enters the impaired waterbodies from the Upper St. Johns River, Econlockhatchee River, and Lake Jesup basins (refer to ***Section 3.1****). Therefore, implementing projects in the watershed alone will not achieve the TMDLs; reductions from the upstream sources must occur before water quality standards can be met in the impaired WBIDs. This BMAP focuses only on those reductions in the TMDL for stormwater and WWTF sources within the watershed. The first phase of the Lake Jesup BMAP was adopted in 2010; however, additional reductions will be needed in the Lake Jesup Basin, as well as the Upper St. Johns River and Econlockhatchee River basins to fully achieve the Lakes Harney and Monroe and MSJR Basin TMDLs.*

- *Noncontributing areas – The Hydrologic Simulation Program – FORTRAN (HSPF) model used to develop the TMDL included a noncontributing area, Subbasin 14, in the Lake Monroe watershed. This area was considered noncontributing because the stormwater from this subbasin does not flow out of the subbasin and, therefore, does not contribute to the impairment in Lake Harney, Lake Monroe, and MSJR. During the BMAP process, stakeholders identified additional noncontributing areas within the City of DeBary and in Volusia County's Lake Winnemissett basin. The entities located within these noncontributing areas were given credit for having a 100% retention project since the model accounted for loads in these areas, which do not actually affect the impaired waterbodies. During the next iteration of the BMAP, consideration will be given to including these additional noncontributing areas in the model to update the loading estimates. Noncontributing areas within Seminole County may need to be updated due to new Light Detection and Ranging (LIDAR) data in portions of the Lakes Harney and Monroe, MSJR, Smith Canal basins.*

- *Basin and subbasin boundaries – Since the HSPF model was developed, additional and more accurate data about the topography of the basin has been collected, such as Volusia County's LIDAR data. During the next iteration of the BMAP, FDEP will review the available data and make adjustments to the overall basin boundary and subbasin boundaries, as needed. Volusia County has provided information showing that a portion of Subbasin 14 should actually be considered as contributing, and FDEP will determine how the subbasin boundaries in this area should be adjusted for the next BMAP iteration.*

- *Agricultural land uses – The estimates of nutrient loading from agricultural land uses are based on the types of commodities and total acreages within the basin. It is common for growers to change commodities, allow land to be fallow, or sell land for urban development. It will be necessary, therefore, to evaluate the agricultural land uses in future BMAP iterations to adjust the loads and reductions from agricultural land uses. If more current information about specific loading rates and best management practice (BMP) effectiveness is known, those should be considered in future iterations.*

- *Updated land uses – The loading estimates in the TMDL are based on land uses at a particular point in time, which allows the model to be validated and calibrated. Land uses, however, change over time and, depending on local trends, can change significantly. The loading estimates for this iteration of the TMDL and BMAP were based on 2004 land use data. Future iterations should consider more recent land use information and whether allocations should be adjusted accordingly.*

1.5 FUTURE GROWTH IN THE BASIN

This BMAP does not include a specific allocation for new development because of Environmental Resource Permit (ERP) program requirements. The ERP program requires that all new discharges into the basin cannot increase existing loads. All ERP applications must include documentation demonstrating compliance with state water quality standards, as well as showing that the project does not adversely affect the quality of receiving waters resulting in water quality standards violations. The Lakes Harney and Monroe and MSJR Basin includes impaired waters that do not currently meet state water quality standards; therefore, new development in the basin cannot increase nutrient loads to the waterbodies.

To ensure that future growth does not add to the degradation of the waterbodies, the local governments are encouraged to pursue low impact development (LID) standards and Florida friendly landscaping to further minimize the impacts of existing development and new development through local development regulations. LID is an approach to development that employs land planning, design practices, and technologies to conserve natural resources and reduce infrastructure costs. These activities could offset loads from future growth and, therefore, may reduce the reductions needed from the entities in future BMAP iterations.

CHAPTER 2: LAKES HARNEY AND MONROE AND MSJR BASIN SETTING

2.1 LAND USE COVERAGE

As shown in **Table 4**, the Lake Harney basin (WBIDs 2964A, 2964, and 2893F) comprises about 145,106 acres, and the Lake Monroe basin (WBIDs 2893E, 2893D, and 2893C) is 71,380 acres (**Table 5)**. Land use assessments were based on 2004 land use data from the St. Johns River Water Management District (SJRWMD). In the Lake Harney basin, natural land uses, including open land, forest, water, and wetland, occupy about 72% of the area. Agricultural land uses make up approximately 22% of the area. Urban land uses (low-, medium-, and high-density residential; mining; and industrial) account for the remaining 6% of the total area. In contrast, urban land uses in the Lake Monroe basin comprise about 45% of the total area. Natural land uses are about 41% of the Lake Monroe basin, with the remaining 14% occupied by agriculture, mining, pastureland, and rangeland. **Figure 2** shows the distribution of land uses in the watershed (FDEP, 2009a).

TABLE 4: 2004 LAND USES IN THE LAKE HARNEY BASIN (WBIDS 2964, 2964A, AND 2893F)

LAND USE TYPE	ACRES	PERCENT
Agricultural General	2,524	2%
Agricultural Tree Crop	975	1%
Forest	47,905	33%
High-Density Residential	123	0%
Industrial	1,154	1%
Low-Density Residential	5,254	4%
Medium-Density Residential	2,070	1%
Mining	223	0%
Open Lands	1,069	1%
Pasture	14,164	10%
Rangeland	13,624	9%
Water	632	0%
Wetlands	55,389	38%
TOTAL	**145,106**	**100%**

TABLE 5: 2004 LAND USES IN THE LAKE MONROE BASIN (WBIDS 2893E, 2893D, AND 2893C)

LAND USE TYPE	ACRES	PERCENT
Agricultural General	1,699	2%
Agricultural Tree Crop	625	1%
Forest	13,132	18%
High-Density Residential	1,926	3%
Industrial	4,489	6%
Low-Density Residential	4,653	7%
Medium-Density Residential	19,977	28%
Mining	358	1%
Open Lands	1,398	2%
Pasture	3,777	5%
Rangeland	4,462	6%
Water	1,247	2%
Wetlands	13,637	19%
TOTAL	**71,380**	**100%**

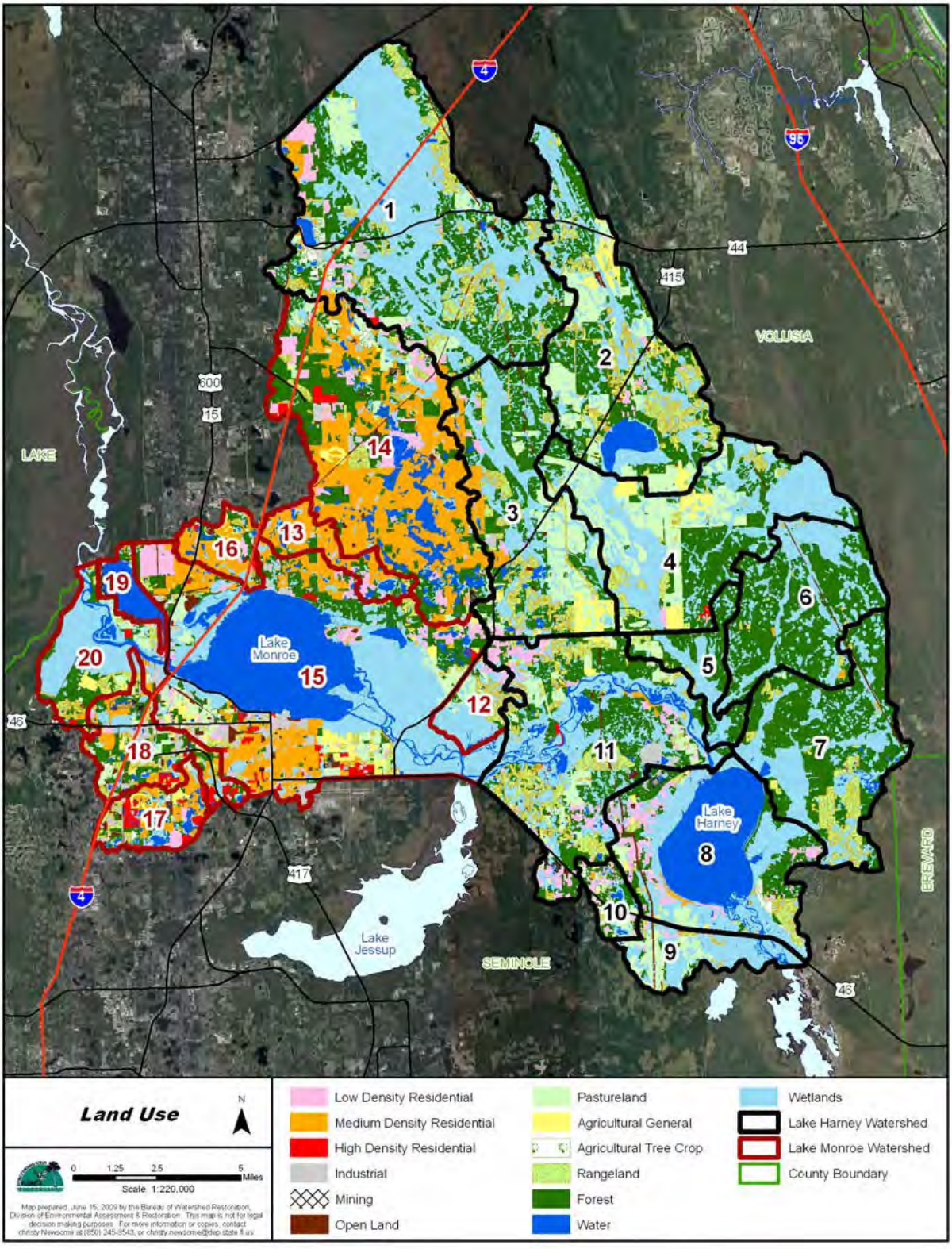

FIGURE 2: 2004 LAND USES IN THE LAKES HARNEY AND MONROE AND MSJR BASIN

In the Smith Canal basin, which is part of the Lake Monroe Basin, the total watershed is approximately 9,993 acres (FDEP, 2009b). Urban land uses (low-, medium-, and high-density residential; industrial and commercial, and mining) make up 42.8% of the total area. The agricultural land uses are about 11.3% of the area. Natural land uses, which include forest, water, wetlands, rangeland, and open land make up the remaining 46.0% of the watershed (see **Table 6**).

TABLE 6: LAND USES IN THE SMITH CANAL WATERSHED

LAND USE TYPE	ACRES	PERCENT
Low-Density Residential	559	5.6%
Medium-Density Residential	1,646	16.5%
High-Density Residential	871	8.7%
Industrial and Commercial	1,141	11.4%
Mining	56	0.6%
Open Land	410	4.1%
Pasture	496	5.0%
Agriculture General	419	4.2%
Agriculture Tree Crop	210	2.1%
Rangeland	1,195	12.0%
Forest	1,812	18.1%
Water	119	1.2%
Wetlands	1,059	10.6%
TOTAL	**9,993**	**100%**

2.2 BASIN HYDROLOGY

The morphology of Lake Harney and Lake Monroe is very similar and both are shallow lakes with relatively large surface areas and long-term average residence times. The average depth in Lake Harney is 7 feet and the average depth in Lake Monroe is 6 feet. The surface area of Lake Harney is 7,935 acres whereas the surface area of Lake Monroe is 8,814 acres. The water residence time for Lake Monroe (based on flow records from 1995 through 2006) was about 23 days, which is slightly longer than the long-term average water residence time for Lake Harney of 15 days. The Lake Harney watershed is approximately 2,070 square miles and the Lake Monroe watershed is 2,624 square miles (FDEP, 2009a).

For the purposes of TMDL modeling, the HSPF model includes two major basins: Lake Harney basin and Lake Monroe basin. The entire model domain includes 19 subbasins, based on the stream network and topography of the watershed. Of these 19 subbasins, 11 were delineated for the Lake Harney basin and 8 subbasins make up the Lake Monroe basin (FDEP, 2009a). **Figure 3** shows the delineation of the two major basins, subbasins, and the direction of flow between the subbasins. As noted earlier, Subbasin 14 in the Lake Monroe basin is considered to be a closed basin, in which the flow from this subbasin does not affect the impaired waterbodies. Therefore, the figure does not show any flow from this subbasin to the surrounding subbasins. In addition, Subbasins 9 and 10 in the Lake Harney basin drain outside the watershed boundaries. Therefore, loading from these subbasins were not considered in the allocations, as they are part of the upstream loading. The figure also shows that the impaired WBIDs are part of Subbasin 8 (WBID 2964A), Subbasin 11 (WBIDs 2964 + 2893F), Subbasin 15 (WBIDs 2893E + 2893D), and Subbasin 20 (WBID 2893C).

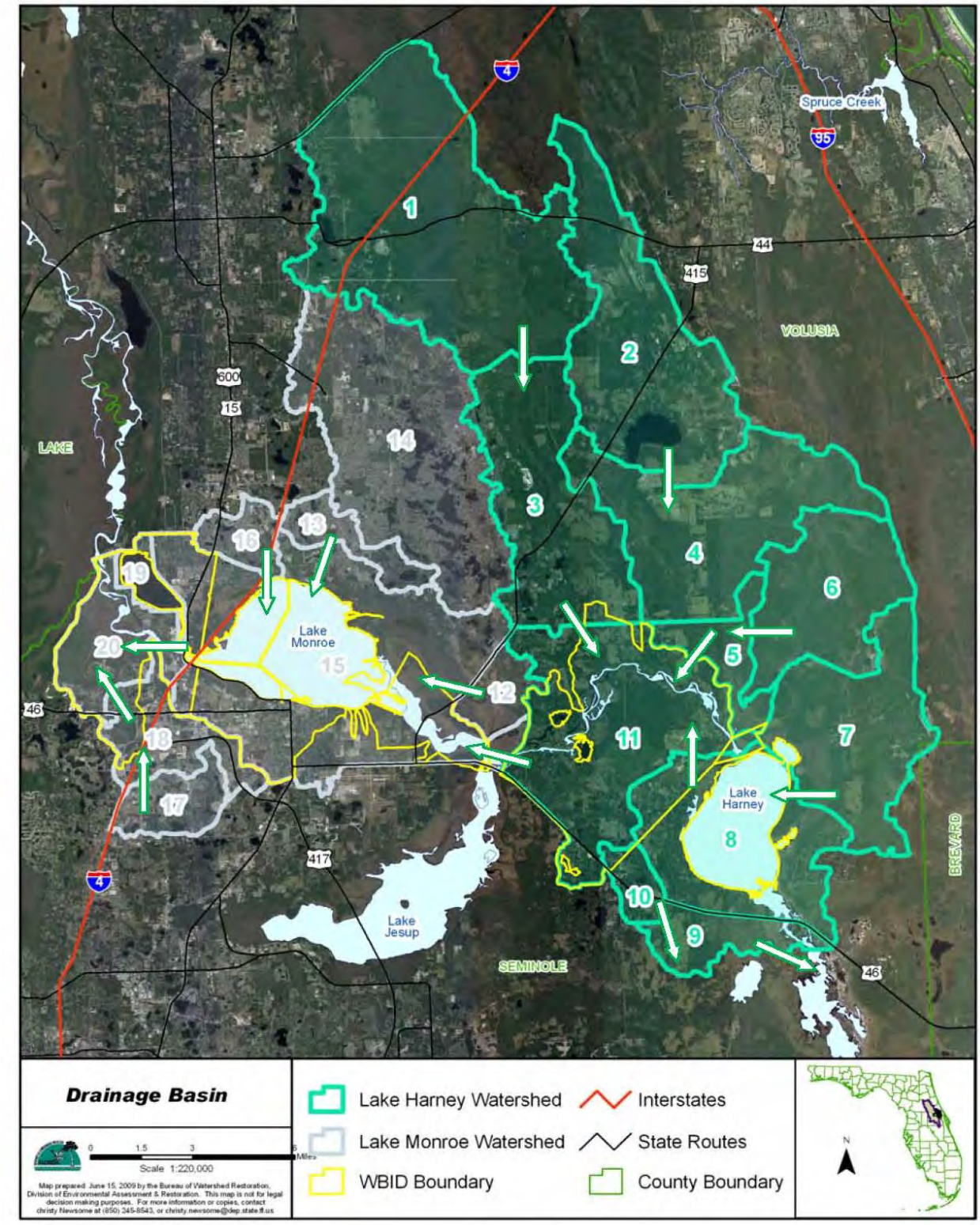

FIGURE 3: HSPF MODEL BASIN AND SUBBASIN DELINEATIONS AND FLOW DIRECTION

2.3 WATER QUALITY TRENDS

The TMDL analyzed the long-term seasonal variation of chlorophyll-a, DO, TN, and TP for the period of record of 1996 through 2007. Overall, peak chlorophyll-a concentrations were observed in the middle of the year, from May to September. DO concentrations lower than 5.0 mg/L were typically observed from July to October. While some low DO concentrations were observed during months with high temperatures (July to September), DO concentrations lower than 5.0 mg/L observed after September could be influenced by the high color of the water, mostly observed between July and the end of the year. This suggests that humic materials from natural sources might also play an important role in causing the observed low DO concentrations. There was no obvious seasonal trend in TN concentrations. A general pattern was observed for TP, which was low at the beginning of each year, rose to the peak value in the middle of the year, and gradually decreased toward the end of the year (FDEP, 2009a).

For all the river segments, the majority of monthly average chlorophyll-a concentrations were lower than 20 µg/L, which is FDEP's standard to assess nutrient impairment in streams and rivers. Values higher than 20 µg/L were mostly observed from May to September. Overall, monthly average chlorophyll-a concentrations were higher in 1999, 2000, and 2001 than in other years, likely caused by the concentration effect of 3 consecutive years of drought. Other than these variations, the overall chlorophyll-a concentrations in these segments appeared relatively stable during the 12-year period. However, a spatial trend in chlorophyll-a was observed along these river segments. For the 3 segments upstream of Lake Jesup (WBIDs 2964A, 2964, and 2893F), the median monthly average chlorophyll-a concentrations were 4.2 µg/L, 3.4 µg/L, and 2.3 µg/L, respectively. The segments downstream of the Lake Jesup outlet (WBIDs 2893E, 2893D, and 2893C) had significantly higher chlorophyll-a concentrations with the median monthly averages of 7.5 µg/L, 11.8 µg/L, and 12.2 µg/L, respectively. These spatial trends indicate that the chlorophyll-a concentration in Lake Jesup has a significant influence on the main stem river segments. In contrast to the monthly average chlorophyll-a concentrations, no obvious upstream and downstream spatial trend was observed for DO concentrations. In addition, the downstream segments only showed slightly higher TN and TP concentrations (FDEP, 2009a).

CHAPTER 3: POLLUTANT SOURCES AND ANTICIPATED OUTCOMES

3.1 SUMMARY OF SOURCES IN THE TMDL

The TMDL includes estimates of TN and TP loading in the Lakes Harney and Monroe and MSJR Basin from main stem upstream inputs (St. Johns River and Econlockhatchee River), Lake Jesup, atmospheric deposition, point source facilities, and watershed stormwater sources. The main stem upstream and Lake Jesup inputs will be addressed by separate BMAPs (a BMAP for the Lake Jesup Basin was adopted by FDEP in May 2010). Atmospheric deposition is considered a background, uncontrollable source; therefore, the TMDL did not require any reductions from this source. The TMDL focus is on load reductions from point source facilities and stormwater sources. The starting loads, allocations, and required reductions in the TMDL are shown in **Table 7** and **Table 8**. Additional details about the sources that are included in this BMAP are provided in the subsections below.

TABLE 7: TN REQUIRED REDUCTIONS BY SOURCE FROM THE LAKES HARNEY AND MONROE AND MSJR TMDL

LAKES HARNEY AND MONROE AND MSJR BASIN	MAIN STEM UPSTREAM (LBS/YR)	LAKE JESUP (LBS/YR)	STORMWATER RUNOFF (LBS/YR)	ATMOSPHERIC DEPOSITION (LBS/YR)	POINT SOURCES (LBS/YR)	TOTAL (LBS/YR)
Starting Load	23,436,117	551,383	718,907	138,632	31,197	24,876,236
Allocation	14,411,709	275,692	625,781	138,632	20,902	15,472,716
Required Reduction	9,024,408	275,691	93,126	0	10,295	9,403,520

TABLE 8: TP REQUIRED REDUCTIONS BY SOURCE FROM THE LAKES HARNEY AND MONROE AND MSJR TMDL

LAKES HARNEY AND MONROE AND MSJR BASIN	MAIN STEM UPSTREAM (LBS/YR)	LAKE JESUP (LBS/YR)	STORMWATER RUNOFF (LBS/YR)	ATMOSPHERIC DEPOSITION (LBS/YR)	POINT SOURCES (LBS/YR)	TOTAL (LBS/YR)
Starting Load	1,562,680	37,279	73,961	6,565	3,449	1,683,934
Allocation	1,061,760	24,604	55,642	6,565	2,311	1,150,882
Required Reduction	500,920	12,675	18,319	0	1,138	533,052

3.1.1 POINT SOURCE FACILITIES

Point sources include both domestic and industrial wastewater treatment facilities. Chapter 62-620, F.A.C., defines domestic wastewater facilities as those facilities that are principally designed "to collect and treat sanitary wastewater or sewage from dwellings or homes, business buildings, institutions, and the like." This rule defines industrial wastewater as "process and non-process wastewater from manufacturing, commercial, mining, and silvicultural facilities or activities, including the runoff and leachate from areas that receive pollutants associated with industrial or commercial storage, handling or processing, and all other wastewater not otherwise defined as domestic wastewater."

In 1995, the U.S. Environmental Protection Agency (EPA) authorized the FDEP to implement the NPDES Program to permit wastewater discharges to state surface water, including industrial and domestic wastewater facilities. Permits are issued under the applicable provisions of Chapter 403, F.S., and appropriate rules in Chapter 62-600, F.A.C., with applicable sections of 40 Code of Federal Regulations (C.F.R.) incorporated by reference. These regulations, rules, and statutes give FDEP the authority to regulate domestic and industrial wastewater facilities.

3.1.2 Municipal Separate Storm Sewer Systems

Many of the municipalities across the basin are regulated by the Florida NPDES Stormwater Program because they discharge stormwater and qualify as "municipal separate storm sewer system." MS4 means a conveyance or system of conveyances such as roads with stormwater systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels, or storm drains:

- *Owned or operated by a State, city, town, county, special district, association, or other public body (created by or pursuant to State Law) having jurisdiction over management and discharge of stormwater and which discharges to surface waters of the state;*
- *Designed or used for collecting or conveying stormwater;*
- *Which is not a combined sewer; and*
- *Which is not part of a Publicly Owned Treatment Works (POTW). POTW means any device or system used in the treatment of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality." This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.*

The basic requirements of this program serve as a foundation for the stormwater management efforts of these communities. The EPA developed the federal NPDES stormwater permitting program in two phases. Phase I, which began in 1990, addresses large and medium MS4s located in incorporated areas and counties with populations of 100,000 or more, as well as specific industrial activities. Phase II, which started in 1999, addresses small MS4s that are designated according to population and other criteria established in Federal and state rules. Small MS4s include MS4s that serve a population of 1,000 or more and are located within an urbanized area.

In October 2000, the EPA authorized FDEP to implement the NPDES stormwater permitting program in the state. This permitting has remained separate from state stormwater/ environmental resource permitting programs and local stormwater/water quality programs, which have their own regulations and permitting requirements. Florida's rules for MS4s can be found in Chapters 62-4, 62-620, 62-621 and 62-624, F.A.C.

Entities in the Lakes Harney and Monroe and MSJR Basin that are currently designated as MS4s are listed in **Table 9**.

TABLE 9: MS4S IN THE LAKES HARNEY AND MONROE AND MSJR BASIN

MS4 Permit Phase	Permittee	Permit Number
I	Seminole County	FLS000038
I	City of Lake Mary	FLS000038
I	City of Sanford	FLS000038
II	Turnpike Authority	FLR04E049
I and II	Florida Department of Transportation (FDOT) District 5	FLS000038 and FLR04E024
II	Volusia County	FLR04E033
II	City of DeBary	FLR04E120
II	City of Deltona	FLR04R099
II	City of Lake Helen	FLR04E125

3.1.3 NPDES MS4 PHASE I STORMWATER PERMIT REQUIREMENTS

Phase I MS4s were subject to a two-part permit application process requiring the development of a proposed stormwater management program (SWMP) that would meet the standard of reducing (discharged) pollutants to the Maximum Extent Practicable (MEP), and incorporation of the SWMP into an individual permit issued to the MS4 operator. The SWMPs for Phase I MS4s include, but are not limited to, measures to:

- *Identify major outfalls and pollutant loadings.*
- *Detect and eliminate non-stormwater discharges (illicit discharges) to the system.*
- *Reduce pollutants in runoff from industrial, commercial, and residential areas.*
- *Control stormwater discharges from new development and redevelopment areas.*
- *Implement a monitoring program.*

To avoid the need for re-opening MS4 permits each time a TMDL or BMAP is adopted, the following language is being added to Phase I MS4 permits that automatically require the implementation of any stormwater requirements in an adopted BMAP. This "TMDL clause" states: "*In accordance with Section 403.067, F.S., NPDES permits must be consistent with the requirements of adopted TMDLs. Therefore, when a Basin Management Action Plan (BMAP) and/or an implementation plan for a TMDL for a water body into which the permitted MS4 discharges the pollutant of concern is adopted pursuant to Section 403.067(7), F.S., the MS4 operator must comply with the adopted provisions of the BMAP and/or implementation plan that specify activities to be undertaken by the permittee during the permit cycle."*

3.1.3.1 NPDES MS4 Phase II Stormwater Permit Requirements

Under a generic permit, operators of regulated Phase II MS4s must develop a SWMP that includes BMPs, with measurable goals, to effectively implement the following six minimum control measures:

1. ***Public Education and Outreach****: Perform educational outreach regarding the harmful impacts of polluted stormwater runoff.*
2. ***Public Participation/Involvement****: Comply with state and local public notice requirements and encourage other avenues for citizen involvement.*
3. ***Illicit Discharge Detection and Elimination****: Implement a plan to detect and eliminate any non-stormwater discharges to the MS4, and create a system map showing outfall locations. Section 62-624.200(2), F.A.C., defines an illicit discharge as "…any discharge to an MS4 that is not composed entirely of stormwater…," except discharges pursuant to a NPDES permit, or those listed in rule that do not cause a violation of water quality standards. Illicit discharges can include septic/sanitary sewer discharge, car wash wastewater, laundry wastewater, improper disposal of auto and household toxics, and spills from roadway accidents.*
4. ***Construction Site Runoff Control****: Implement and enforce an erosion and sediment control program for construction activities.*

5. ***Post-construction Runoff Control****: Implement and enforce a program to address discharges of post-construction stormwater runoff from new development and redevelopment areas. (NOTE: This minimum control is met through state stormwater permitting requirements under Part IV, Chapter 373, F.S., as a qualifying alternative program.)*

6. ***Pollution Prevention/Good Housekeeping****: Implement a program to reduce pollutant runoff from municipal operations and properly and perform staff pollution prevention training.*

The generic permit [Section 62-621.300(7)(a), F.A.C.] also states: *If a TMDL is approved for any water body into which the Phase II MS4 discharges, and the TMDL includes requirements for control of stormwater discharges, the operator must review its stormwater management program for consistency with the TMDL allocation. If the Phase II MS4 is not meeting its TMDL allocation, the operator must modify its stormwater management program to comply with the provisions of the TMDL Implementation Plan applicable to the operator in accordance with the schedule in the Implementation Plan.*

3.1.4 Non-MS4 Stormwater Sources

Section 403.067 (7)(b)2.f, F.S., prescribes the pollutant reduction actions required for nonagricultural pollutant sources that are not subject to NPDES permitting. These "non-MS4 sources" must also implement the pollutant reduction requirements detailed in a BMAP and are subject to enforcement action by FDEP or a water management district based upon a failure to implement their responsibilities under the BMAP.

Urban stormwater load reductions that are not being discharged by a permitted MS4 were established in the "load allocation" component of the TMDL. These allocations, and the responsibility for meeting them, were assigned to the entity that owns these non-MS4 urban lands. The entities evaluated the loadings from these areas and determined projects to reduce the stormwater pollutant loads. The detailed project tables are included in **Appendix E**. Failure to reduce these loadings can result in enforcement action by FDEP pursuant to Section 403.067(7)(b)2(h).

FDEP can seek to designate an area as a regulated Phase II MS4 in accordance with Rule 62-624.800, F.A.C. One of the primary designations applies when a TMDL is adopted. FDEP can designate an area as a regulated Phase II MS4 if the discharges are determined to be a significant contributor of pollutants to surface waters of the State, which can occur when a TMDL has been adopted by FDEP for a waterbody or segment into which the Phase II MS4 discharges the pollutant(s) of concern. If an area is designated as a regulated Phase II MS4, it will be subject to the conditions of the Phase II MS4 Generic Permit.

3.1.5 Agriculture

The primary agricultural land use in the Lakes Harney and Monroe and MSJR watershed is cow-calf operations (pasture). Other agricultural land uses include nurseries, row/field crops, citrus, and horse farms. The majority of the horse farms can be characterized as small, noncommercial hobby farms scattered throughout residential areas. The land use data also includes poultry feeding operations, but field staff and county Extension staff in the area have not observed any that are still in production. Most of the agricultural acreage is located within the Lake Harney basin.

Due to urban encroachment, citrus health issues (freeze/disease), and the downturn in the economy, many citrus, row crop, and nursery operations either have been abandoned or have

significantly lowered their production acreage. In recent years, some of this acreage may have been shifted to other commodities, but a survey of the most recent aerial imagery for the basin also shows a significant portion of the row/field crop acreage is now low-density residential. The majority of the remaining row crop operations in the basin are small "u-pick" farms.

3.2 ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

With implementation of the projects outlined in this BMAP, reductions in the TN and TP loads to Lakes Harney and Monroe and MSJR Basin are expected to improve water quality conditions. The following outcomes are expected from BMAP implementation:

- *Improved water quality trends in the watershed tributaries and Smith Canal;*
- *Decreased loading of the target pollutants (TN and TP);*
- *Increased coordination between state and local governments and within divisions of local governments in problem solving for surface water quality restoration;*
- *Determination of effective projects through the stakeholder decision-making and priority-setting processes;*
- *Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions; and*
- *Enhanced understanding of basin hydrology, water quality, and pollutant sources.*

CHAPTER 4: DETAILED ALLOCATIONS

4.1 DETAILED ALLOCATIONS

The stakeholders determined that assigning detailed allocations was the best approach for achieving the TMDL reductions. The acreage and loading information for each stakeholder was calculated using output from the HSPF model. A Geographic Information Systems (GIS) base map was created to help determine allocations. The steps to calculate the detailed allocations are outlined in the sections below.

4.1.1 CALCULATING BASELINE LOADS

The TMDL included detailed allocations for the WWTF in the basin; therefore, the BMAP process only assigned detailed allocations for the stormwater sources within the Lakes Harney and Monroe and MSJR watershed. The first step in determining the stormwater loads was to calculate the baseline loading using the information from the TMDL model. To do this, the natural land use acres and loadings were removed from the GIS base map. These areas were removed because the TMDL does not require load reductions for the natural areas; therefore, the stakeholders are not required to make reductions for these land uses. The individual entity shapefiles were then created by clipping each jurisdiction from the GIS base map as follows:

- *FDOT roads and right-of-ways;*
- *Turnpike Authority roads and right-of-ways;*
- *Areas with agricultural land uses;*
- *Municipalities each to its own jurisdictional boundary; and*
- *Remaining area assigned to each county using their jurisdictional boundaries.*

The TN and TP starting loads by entity are shown in **Table 10**.

TABLE 10: STARTING LOADS BY ENTITY

ENTITY	AREA (ACRES)	TN STARTING LOAD (LBS/YR)	TP STARTING LOAD (LBS/YR)
Agriculture	20,250.3	130,168.2	29,970.4
DeBary	3,720.3	19,906.5	3,149.0
DeLand	37.5	192.0	14.8
Deltona	4,189.5	25,399.8	4,128.2
FDOT	1,762.3	10,112.0	1,325.3
Lake Helen	347.8	2,052.4	297.0
Lake Mary	1,639.2	6,572.0	948.9
Orange City	18.9	105.4	16.6
Sanford	4,764.6	41,398.4	6,490.8
Seminole County	6,027.2	34,105.1	5,132.7
Turnpike Authority	342.5	1,240.1	108.5
Volusia County	5,356.2	26,511.6	3,828.7
Natural Background	137,104.5	409,606.8	16,154.2
Total	**185,560.9**	**707,370.4**	**71,565.2**

4.1.2 DE MINIMUS *DETERMINATION*

The starting loads from **Table 10** were then sorted for TN and TP loads, from highest to lowest, to determine whether any entity had loads low enough that reductions from these areas would have no significant impact on the required reductions in the first phase of the BMAP. These entities are considered "*de minimus*." **Table 11** and **Table 12** show the data used to determine entities that are *de minimus* for TN and TP, respectively.

TABLE 11: TN *DE MINIMUS* DETERMINATION

Note: Entities marked with an "*" indicate entities that have *de minimus* load contributions.

ENTITY	TN STARTING LOAD (LBS/YR)	PERCENT OF STARTING LOAD
Agriculture	130,168.2	43.7%
Sanford	41,398.4	13.9%
Seminole County	34,105.1	11.5%
Volusia County	26,511.6	8.9%
Deltona	25,399.8	8.5%
DeBary	19,906.5	6.7%
FDOT	10,112.0	3.4%
Lake Mary	6,572.0	2.2%
Lake Helen*	2,052.4	0.7%
Turnpike Authority*	1,240.1	0.4%
DeLand*	192.0	0.1%
Orange City*	105.4	0.0%

TABLE 12: TP *DE MINIMUS* DETERMINATION

Note: Entities marked with an "*" indicate entities that have *de minimus* load contributions.

ENTITY	TP STARTING LOAD (LBS/YR)	PERCENT OF STARTING LOAD
Agriculture	29,970.4	54.1%
Sanford	6,490.8	11.7%
Seminole County	5,132.7	9.3%
Deltona	4,128.2	7.5%
Volusia County	3,828.7	6.9%
DeBary	3,149.0	5.7%
FDOT	1,325.3	2.4%
Lake Mary	948.9	1.7%
Lake Helen*	297.0	0.5%
Turnpike Authority*	108.5	0.2%
Orange City*	16.6	0.0%
DeLand*	14.8	0.0%

DeLand, Lake Helen, Orange City, and Turnpike Authority each contribute less than 1% of the total load and combined they contribute approximately 1% of the total load. Therefore, these entities are considered to be *de minimus* and were not assigned an allocation for either TN or TP for the first phase of the BMAP. The loads associated with these entities were not

reallocated to the other stakeholders in the basin. This *de minimus* designation does not preclude these entities from implementing projects to achieve nutrient reductions.

4.1.3 Target Load per Acre

To determine the total allowable load of TN and TP for each entity, a target load per acre for each nutrient parameter was determined by dividing the TMDL target load for anthropogenic stormwater sources by the total anthropogenic acreage in the basin. The calculated target loads per acre are shown in **Table 13**.

Table 13: Target Loads per Acre for TN and TP

Anthropogenic Acres	Target TN Load (lbs/yr)	Target TN Load/Acre (lbs/ac/yr)	Target TP Load (lbs/yr)	Target TP Load/Acre (lbs/ac/yr)
48,456.3	210,073.5	4.34	38,946.3	0.80

The allocations to each entity using these target loads per acre are outlined in the sections below by source.

4.1.4 Allocations by Source

4.1.4.1 NPDES Facility

The allocations for the NPDES facility in the basin were included in the TMDL, and FDEP has incorporated these discharge limits into the facility's permit. The starting loads (mean annual loading for the period of 1997-2003) and the allocations for the Sanford North WWTF are listed in **Table 14**.

Table 14: NDPES Facility and Allocations in the Lakes Harney and Monroe and MSJR Basin

NPDES Facility	Permit #	TN Mean Annual Loading (1997-2003) (lbs/yr)	TN Allocation (lbs/yr)	TP Mean Annual Loading (1997-2003) (lbs/yr)	TP Allocation (lbs/yr)
Sanford North WWTF	FL0020141	28,527	19,342	3,249	2,345

In November 2009, FDEP issued the domestic wastewater renewal permit for the City of Sanford North WWTF with the existing permitted capacity of 7.3 million gallons per day (MGD) annual average daily flow. The permit authorizes the city's extensive reclaimed water reuse system and includes a 1.0 MGD annual average daily flow wet weather discharge to the St. Johns River downstream of Lake Monroe. This permit renewal incorporated the city's wasteload allocations as contained in the TMDL, which represent a 38% reduction in TN loading and a 32% reduction in TP loading from the previously permitted surface water discharge. The permit was issued with an Administrative Order that provides the city with time to evaluate alternatives; develop a recommended course of action; and design, permit, and construct improvements to meet the new wasteload allocations. The city determined that upgrading the Sanford North WWTF to provide a new biological nutrient removal treatment process would be the most feasible alternative to comply with the new wasteload allocations. As of the time of this BMAP, design of the new treatment process is underway. The Administrative Order requires that the City complete the necessary improvements by February 1, 2014.

4.1.4.2 MS4s

The total required reductions for each of the MS4s are shown in **Table 15** and **Table 16**.

TABLE 15: TN REQUIRED REDUCTIONS FOR THE MS4S

ENTITY	AREA (ACRES)	TN TARGET (LBS/ACRE/YR)	TN TARGET (LBS/YR)	TN STARTING LOAD (LBS/YR)	TN TOTAL REQUIRED REDUCTION (LBS/YR)
DeBary	3,720.3	4.34	16,146.1	19,906.5	3,760.4
Deltona	4,189.5	4.34	18,182.4	25,399.8	7,217.4
FDOT	1,762.3	4.34	7,648.4	10,112.0	2,463.6
Lake Mary	1,639.2	4.34	7,114.1	6,572.0	0.0
Sanford	4,764.6	4.34	20,678.4	41,398.4	20,720.0
Seminole County	6,027.2	4.34	26,158.0	34,105.1	7,947.1
Volusia County	5,356.2	4.34	23,245.9	26,511.6	3,265.7
Total	**27,459.3**	**N/A**	**119,173.3**	**164,005.4**	**45,374.2**

TABLE 16: TP REQUIRED REDUCTIONS FOR THE MS4S

PERMITTEE	AREA (ACRES)	TP TARGET (LBS/ACRE/YR)	TP TARGET (LBS/YR)	TP STARTING LOAD (LBS/YR)	TP TOTAL REQUIRED REDUCTION (LBS/YR)
DeBary	3,720.3	0.80	2,976.2	3,149.0	172.8
Deltona	4,189.5	0.80	3,351.6	4,128.2	776.6
FDOT	1,762.3	0.80	1,409.8	1,325.3	0.0
Lake Mary	1,639.2	0.80	1,311.4	948.9	0.0
Sanford	4,764.6	0.80	3,811.7	6,490.8	2,679.1
Seminole County	6,027.2	0.80	4,821.8	5,132.7	310.9
Volusia County	5,356.2	0.80	4,285.0	3,828.7	0.0
Total	**27,459.3**	**N/A**	**21,967.5**	**25,003.6**	**3,939.4**

This first BMAP will address 50% of the total required reductions shown in the tables above. **Table 17** shows the TN and TP reductions for the first 5-year BMAP period from mid-2012 through mid-2017.

TABLE 17: REQUIRED REDUCTIONS FOR THE MS4S

ENTITY	BMAP 1 TN REQUIRED REDUCTION (LBS/YR)	BMAP 1 TP REQUIRED REDUCTION (LBS/YR)
DeBary	1,880.2	86.4
Deltona	3,608.7	388.3
FDOT	1,231.8	0.0
Lake Mary	0.0	0.0
Sanford	10,360.0	1,339.6
Seminole County	3,973.6	155.5
Volusia County	1,632.9	0.0
Total	**22,687.1**	**1,969.7**

4.1.4.3 Agriculture

The agricultural total reductions and the reductions for the first iteration of the BMAP are shown in **Table 18**.

TABLE 18: AGRICULTURAL REQUIRED REDUCTIONS

Parameter	Area (Acres)	Target (lbs/acre/yr)	Target Load (lbs/yr)	Starting Load (lbs/yr)	Required Reduction (lbs/yr)	BMAP 1 Required Reduction (lbs/yr)
TN	20,250.3	4.34	87,886.3	130,168.2	42,281.9	21,141.0
TP	20,250.3	0.80	16,200.2	29,970.4	13,770.2	6,885.1

CHAPTER 5: MANAGEMENT ACTIONS

"Management actions" refers to the suite of activities that the allocation entities will be conducting to achieve their required TN and TP reductions. These include both structural and nonstructural activities.

Management actions had to meet several criteria to be considered eligible for credit in the BMAP. All projects, programs, and activities were required to address nutrient loads (TN, TP, or both) to receive credit, and must be located within the Lakes Harney and Monroe and MSJR Basin. Completed projects since January 1, 2003 were eligible for BMAP credit. Management actions were only given credit for the portion of the load reduction that was over and above any permit requirements. This criterion was needed since permit conditions are established to maintain the current condition (prevent further impacts from the development) and do not contribute to the improvement of water quality in the Lakes Harney and Monroe and MSJR Basin.

Based on these eligibility requirements, the entities submitted structural and nonstructural projects to reduce the nonpoint stormwater loading. The projects submitted by the MS4s, non-MS4s, and agriculture are outlined in the sections below.

5.1 MS4 PROJECTS TO MEET ALLOCATIONS

All NPDES permits, including MS4 permits, must be consistent with the requirements of adopted TMDLs. Section 403.067 (7)(b), F.S., prescribes the criteria for TMDL implementation. In accordance with this section, implementation of a TMDL or BMAP for holders of NPDES MS4 permits shall be achieved to the MEP, through the use of BMPs or other management measures. These management measures include, but are not limited to:

- *Non-regulatory and incentive based programs including best management practices, cost sharing, waste minimization, pollution prevention, public education*
- *Non-structural best management practices*
- *Water quality management and restoration activities*
- *Public works including capital facilities*
- *Land acquisition*
- *Local ordinances*
- *Regulatory incentive programs*

To comply with the MEP standard, the SWMP must be designed and implemented to reduce the discharge of pollutants to surface waters of the State. Implementation of BMPs consistent with the provisions of the SWMP required pursuant to a MS4 permit constitutes compliance with the standard of reducing pollutants to the MEP for discharges to unimpaired waters. However, MS4s must also continue to assess and adjust their list of approved projects (**Appendix E**) to achieve the greatest reduction of pollutants practicable to protect receiving waters in accordance with an adopted TMDL or BMAP.

Entities that fail to implement their list of approved projects in order to reduce pollutants to the MEP standard will be subject to enforcement action in accordance with Sections 403.061, 403.121, and 403.161, F.S., and Rule 62-650.300(4), F.A.C. In addition, both MS4 Phase I and

Phase II permits include provisions for revising the effluent limitations, monitoring requirements, and stormwater management programs to meet applicable TMDL allocations that are consistent with the assumptions and requirements of the adopted BMAP.

The projects and timeframes for implementation submitted by the entities to achieve their first 5-year BMAP reductions are summarized in **Table 19** and **Table 20** and detailed in **Appendix E**. These projects were submitted to provide reasonable assurance to FDEP that the MS4 permittee has a plan on how they will meet their allocation. However, this list of projects is meant to be flexible enough to allow for changes that may occur over time, provided that the reduction is still met within the specified timeframe. New projects may be substituted for those identified in **Appendix E** during the annual BMAP progress report process.

TABLE 19: SUMMARY OF MS4 TN LOAD REDUCTIONS BY PROJECT TYPE

ENTITY	STRUCTURAL STORMWATER	PUBLIC EDUCATION	STREET SWEEPING	NONCONTRIBUTING DRAINAGE BASIN	TOTAL (LBS/YR)
DeBary	N/A	N/A	N/A	13,561.7	**13,561.70**
Deltona	5,881.3	1,270.0	N/A	N/A	**7,151.30**
FDOT	1,470.3	101.1	1,326.7	312.5	**3,210.60**
Lake Helen	N/A	30.8	N/A	N/A	**30.80**
Lake Mary	N/A	361.5	9.6	N/A	**371.10**
Sanford	2,037.5	2,069.9	8,866.5	N/A	**12,973.90**
Seminole County	5,462.1	1,875.8	300.0	N/A	**7,637.90**
Turnpike Authority	N/A	N/A	21.6	N/A	**21.60**
Volusia County	48.3	1,391.9	115.5	657.9	**2,213.60**
Total	**14,889.5**	**7,101.0**	**10,639.9**	**14,532.1**	**47,172.50**

TABLE 20: SUMMARY OF MS4 TP LOAD REDUCTIONS BY PROJECT TYPE

ENTITY	STRUCTURAL STORMWATER	PUBLIC EDUCATION	STREET SWEEPING	NONCONTRIBUTING DRAINAGE BASIN	TOTAL (LBS/YR)
DeBary	N/A	N/A	N/A	2,207.0	**2,207.0**
Deltona	1,023.5	206.4	N/A	N/A	**1,229.9**
FDOT	301.5	13.3	849.1	46.9	**1,210.8**
Lake Helen	N/A	4.5	N/A	N/A	**4.5**
Lake Mary	N/A	52.2	6.4	N/A	**58.6**
Sanford	579.4	324.5	3,993.3	N/A	**4,897.2**
Seminole County	1,488.5	282.3	135.1	N/A	**1,905.9**
Turnpike Authority	N/A	N/A	14.4	N/A	**14.4**
Volusia County	11.5	201.0	52.0	93.8	**358.3**
Total	**3,404.4**	**1,084.2**	**5,050.3**	**2,347.7**	**11,886.6**

5.2 NON-MS4 URBAN STORMWATER PROJECTS TO MEET ALLOCATIONS

The projects and timeframes for implementation submitted by the entities to achieve their first 5-year BMAP reductions are summarized in **Table 21** and **Table 22** and detailed in **Appendix E**. These projects were submitted to provide reasonable assurance to FDEP that the non-MS4 entities have a plan on how they will meet their allocation. However, this list of projects is meant to be flexible enough to allow for changes that may occur over time, provided that the reduction

is still met within the specified timeframe. New projects may be substituted for those identified in **Appendix E** during the annual BMAP progress report process.

TABLE 21: SUMMARY OF NON-MS4 TN LOAD REDUCTIONS BY PROJECT TYPE

ENTITY	STRUCTURAL STORMWATER	PUBLIC EDUCATION	STREET SWEEPING	TOTAL (LBS/YR)
DeLand	N/A	9.1	N/A	**9.1**
Orange City	N/A	1.3	N/A	**1.3**
Total	**N/A**	**10.4**	**N/A**	**10.4**

TABLE 22: SUMMARY OF NON-MS4 TN LOAD REDUCTIONS BY PROJECT TYPE

ENTITY	STRUCTURAL STORMWATER	PUBLIC EDUCATION	STREET SWEEPING	TOTAL (LBS/YR)
DeLand	N/A	0.7	N/A	**0.7**
Orange City	N/A	0.2	N/A	**0.2**
Total	**N/A**	**0.9**	**N/A**	**0.9**

5.3 PROVISIONAL BMPS

Several of the BMP activities included in the project lists were assigned provisional reduction estimates for the purposes of this first iteration of the BMAP. These provisional BMPs are floating islands as well as public education and outreach efforts. Studies to estimate the efficiencies of these BMPs are currently being conducted across the state, which will provide better information on the expected reductions from these BMPs for use in the next iteration of the BMAP to revise the project reductions. If the new BMP information indicates lower efficiencies than what was estimated for this BMAP, the entities that listed these BMPs in their project tables may need to provide additional projects to make up for the difference in reductions. If the new BMP information indicates higher efficiencies, the entities will receive additional credit if they included these BMPs on their project list.

5.3.1 FLOATING ISLANDS

The provisional credit for floating islands was assigned as a 20% reduction in both TN and TP. As of the time of BMAP adoption, none of the stakeholders included floating islands in the project tables; however, the stakeholders do have the option of adding floating islands to the list of projects in the future.

5.3.2 PUBLIC EDUCATION AND OUTREACH

Up to a 6% reduction in the baseline load for both TN and TP was assigned based on the education and outreach efforts conducted by each entity. The 6% load reduction estimate was determined from the Center for Watershed Protection Watershed Treatment Model. Credit was given for the following applicable education activities:

1. *Local funding to implement the Florida Yards and Neighborhoods (FYN) program within the city or county.*
2. *Local land development codes or ordinances that require Florida Friendly landscaping on all new developments; require commercial landscapers to obtain training and certification through the Green Industry BMP program; require irrigation systems per Sections 125.568 and 166.048, F.S. and Section 373.185, F.S.; and which specify fertilizer application rates and types. Local ordinances that control pet waste and require that residents pick up and properly dispose of pet wastes.*

3. *Implementation of public service announcements (PSAs) on local cable or commercial television and radio stations.*
4. *Informational pamphlets on pollution prevention, fertilizer application, Florida Friendly Landscaping, water conservation, septic tank maintenance, etc. Presentations on these topics to civic groups, local businesses, students, and the general public.*
5. *Websites to provide information on reducing nutrient pollution for homeowners and businesses.*
6. *Inspection program and public call-in number to address illicit discharges.*

Credit was assigned to the entities for the above efforts as follows:

- *If all six types of activities are conducted by an entity, then the full 6% reduction was assigned.*
- *If an entity only has FYN, they received a 3% reduction credit.*
- *If an entity only has the Florida friendly ordinances (irrigation, landscaping, fertilizer, and pet waste management), they received a 2% reduction.*
- *If an entity only has the PSAs, websites, brochures, and the inspection program, they received a 1% reduction credit.*
- *Other combinations of efforts were analyzed on a case-by-case basis for credit.*

Appendix E summarizes the public education activities conducted by each entity and the associated load reductions.

5.4 AGRICULTURE

Table 23 gives a breakout of agricultural land uses in the Lakes Harney and Monroe and MSJR Basin, according to 2004 SJRWMD land use data. **Figure 4** shows the approximate location of these agricultural lands in the basin.

TABLE 23: AGRICULTURAL LAND USES IN THE LAKES HARNEY AND MONROE AND MSJR BASIN (2004 SJRWMD LAND USE DATA)

LAND USE CODE	CODE DESCRIPTION	TOTAL ACRES
2120	Unimproved Pasture	2,574.4
2130	Woodland Pasture	843.2
2110	Improved Pasture	12,483.6
2140	Row Crop	1,525.1
2150	Field Crops	795.9
2160	Mixed Crops	541.8
2200	Tree Crops	13.3
2210	Citrus	450.1
2240	Abandoned Tree Crops (citrus)	633.9
2310	Cattle Feeding Operation	11.3
2320	Poultry Feeding Operation	80.9
2410	Tree Nurseries	76.5
2430	Ornamentals	243.0
2431	Shade Ferns	0.6
2432	Hammock Ferns	2.4
2500	Specialty Farms	2.2
2510	Horse Farm	174.1
2600	Other Open Land	0.1

LAND USE CODE	CODE DESCRIPTION	TOTAL ACRES
2610	Fallow Cropland	1.7
2540	*Aquaculture*	*12.5*
N/A	**Total**	**20,466.6**

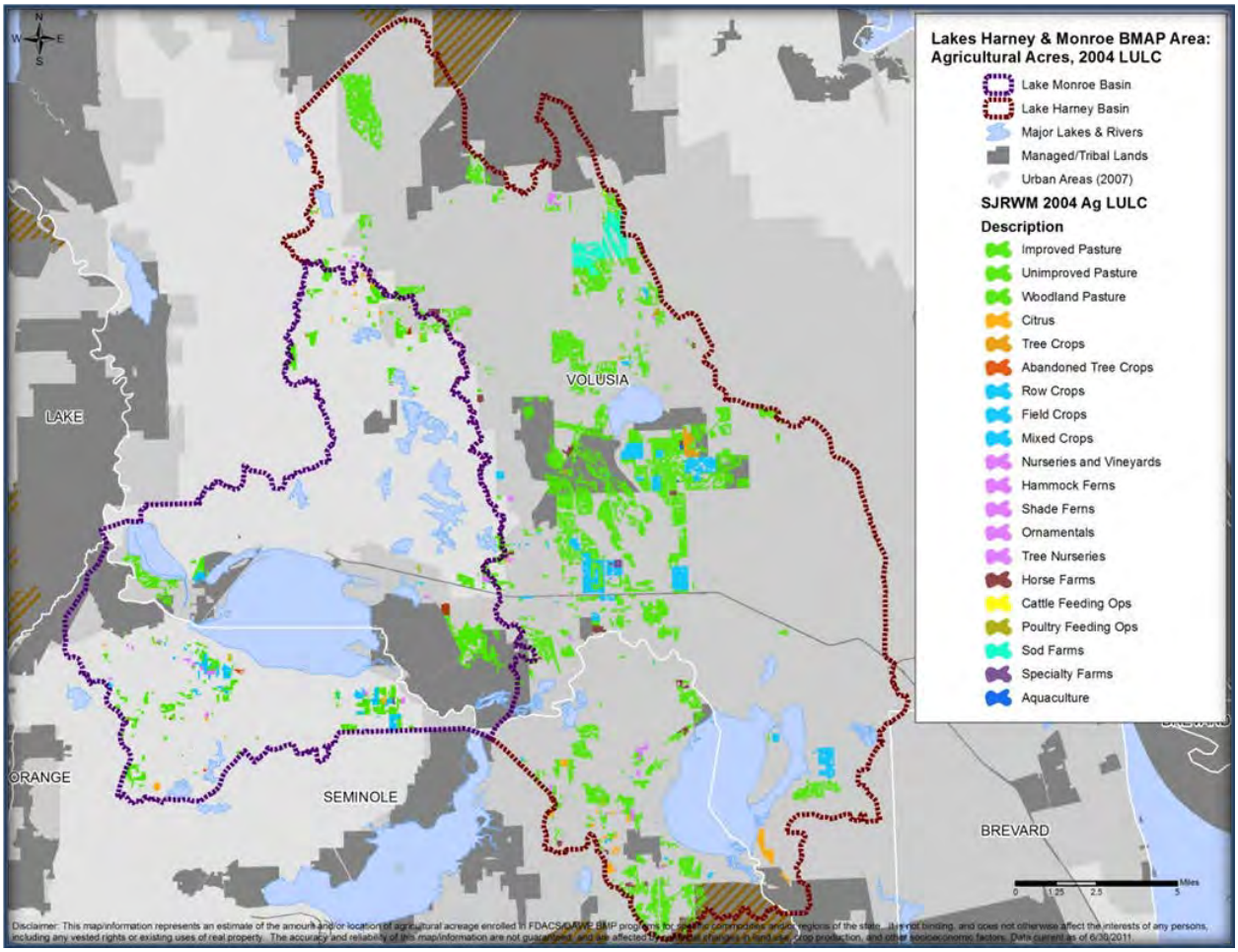

FIGURE 4: AGRICULTURAL LANDS IN THE LAKES HARNEY AND MONROE AND MSJR BASIN IN 2004

Land use data are helpful as a starting point for estimating agricultural acreage and developing BMP implementation strategies; however, their inherent limitations must be noted. The time of year during which land use data are collected (through aerial photography) affects the accuracy of aerial photography interpretation. This can result in an inappropriate analysis of the data and can hamper decision-making. Another limitation is that the specific agricultural activity being conducted is not always apparent. For example, some acreage under the improved pasture classification may be used for cattle grazing, some may consist of forage grass that is periodically harvested and sold for hay, and/or some may comprise a fallow vegetable field awaiting planting. Operations that may fall into this land use category fertilize at different rates (e.g., hay operations and some other commodities typically fertilize at or below rates recommended by the University of Florida–Institute of Food and Agricultural Sciences [UF–IFAS]); therefore, it would be meaningful for the purposes of evaluating potential nutrient impacts to know specific land uses. Because of error in the collection and characterization of land use data and changes in land use over time, the land use acreages are subject to adjustment, as discussed later in this section.

5.4.1 Agricultural Producers' Responsibilities Under the FWRA

Section 403.067(7)(b), F.S., requires that nonpoint pollutant sources (such as agriculture) included in a BMAP demonstrate compliance with pollutant reductions needed to meet a TMDL, either by implementing appropriate BMPs (adopted by FDACS or FDEP, as applicable), or conducting water quality monitoring prescribed by FDEP or the applicable water management district. If these pollutant sources do not either implement BMPs or conduct monitoring, they may be subject to enforcement by FDEP or the applicable water management district.

Pursuant to section 403.067(7)(c), F.S., implementation of FDACS-adopted, FDEP-verified BMPs in accordance with FDACS rule provides a presumption of compliance with state water quality standards. In addition, growers who implement BMPs may be eligible for cost share from the water management district, FDACS, or others. Through the Office of Agricultural Water Policy (OAWP), Florida Forest Service, and Division of Aquaculture, FDACS develops, adopts, and assists producers in implementing agricultural BMPs to improve water quality and water conservation.

5.4.2 Agricultural Best Management Practices

BMPs are individual or combined practices determined through research, field-testing, and expert review to be the most effective and practicable means for improving water quality, taking into account economic and technological considerations. Two categories of FDACS-adopted BMPs are nutrient management and irrigation management. Nutrient management is the amount, timing, placement, and type of fertilizer. Irrigation management is the maintenance, scheduling, and overall efficiency rating of irrigation systems. In several areas of the state, FDACS-funded Mobile Irrigation Labs identify and demonstrate irrigation efficiency techniques to growers.

By definition, BMPs are technically and economically feasible. However, FDACS BMP manuals contain some BMPs that may only be affordable with financial assistance. The BMP checklists allow producers to indicate whether a BMP is not economically feasible, on a case-by-case basis. As BMP cost share becomes available to the basin, FDACS will work with producers to implement applicable key BMPs that otherwise are not affordable. The key nutrient and irrigation management BMPs that would most likely be applicable to operations in the basin are as follows:

- *Determining Nutrient Needs:*
  - *Soil and Tissue Testing: Used to base fertilizer applications on plant needs and available nutrients in the soil; helps prevent over-application of fertilizer.*
  - *Nutrient Budgeting: Adjustment of fertilizer regime to account for other nutrient sources, such as bio-solids, legumes, manure, and nutrient-laden irrigation water; helps prevent over-application of fertilizer.*
- *Managing Nutrient Application:*
  - *Precision Application of Nutrients: Use of specialized equipment for precise placement of nutrients on targeted areas at specified rates; reduces total amount used and prevents stray applications.*
  - *Equipment Calibration/Maintenance: Ensures proper functioning of equipment; prevents misapplication or over-application of fertilizer materials.*

- *Split Fertilizer Applications: Multiple applications timed with optimal growth stages; allows plants to assimilate nutrients more efficiently; reduces nutrient loss in leaching and runoff.*
- *Fertigation: Application of fertilizer through irrigation water; allows for direct nutrient application to the crop root zone and more efficient assimilation by plants, reducing nutrient loss in leaching and runoff.*
- *Controlled-Release Fertilizer: Use of fertilizer formulations that have a controlled nutrient release curve; reduces nutrient loss to leaching and runoff.*
- *Fertilizer Application Setbacks from Waterbodies (wetlands, watercourses, sinks, springs, etc.): Establishes a zone where no fertilizer will be applied; reduces nutrient loadings to waterbodies.*

- *Managing Irrigation:*
  - *Irrigation Scheduling: Planning when to irrigate to reduce water and nutrient losses, based on available soil moisture content, evapotranspiration levels, recent rainfall, and time of day.*
  - *Monitoring Soil Moisture and Water Table: Use of devices that measure the water table level and the amount of water in the soil; is a key component of proper irrigation scheduling.*
  - *Tailwater Recovery: Use of down-gradient catchment ponds to trap irrigation tailwater to be reused on cropland; reduces offsite transport of nutrients and conserves water.*
- *Treatment and Erosion Control:*
  - *Filter Strips: Vegetated strips of land designed to reduce nutrients and sediments in surface water runoff from fields, pastures, and livestock high-intensity areas before it reaches downstream waterbodies.*
  - *Vegetative Buffers: Establishment of riparian and/or wetland buffers to attenuate and assimilate nutrient- or sediment-laden surface flows coming from cropped/grazed areas.*
  - *Ditch Maintenance and Retrofits: Use of rip rap, sediment traps, staging structures, and permanent vegetative bank cover to minimize erosion and transport of nutrient-laden sediments.*
- *Livestock Management (applicable to cow/calf and equine operations):*
  - *Alternative Water Sources: Use of upland livestock watering ponds and/or water troughs; minimizes manure deposition in waterbodies.*
  - *Rotational Grazing: Movement of cattle to different grazing areas on a planned basis; prevents concentrated waste accumulations and denuding of pasture areas. May involve fencing.*
  - *High-Intensity Areas Location: Siting of cowpens, supplemental feed areas, etc., away from waterbodies to minimize nutrient loadings.*
- *Operations Management:*

- *Fertilizer Storage: Proper location/storage of bulk fertilizer products to prevent nutrient loadings.*
- *Fertilizer Mix/Load: Use of appropriate dedicated or temporary mix/load areas located away from waterbodies to prevent nutrient loading.*
- *Employee Training: Training provided to farm workers on how to implement BMPs.*
- *Record Keeping: Proper record keeping provides accountability in the implementation of BMPs, and assists the producer in making nutrient and irrigation management decisions.*

OAWP BMPs and staff contact information are located at http://www.floridaagwaterpolicy.com. Printed BMP manuals can be obtained in the local extension office at county agricultural extension centers, or by contacting OAWP field staff.

5.4.3 FDACS OAWP Role in BMP Implementation and Follow Up

5.4.3.1 BMP Implementation

The OAWP assists agricultural producers enrolled in its programs in implementing BMPs. The OAWP employs field staff and contracts with service providers to work with producers to submit notices of intent (NOIs) to implement the BMPs appropriate for their operations. Depending on the region of the state, these providers include the soil and water conservation districts, UF–IFAS, and natural resource development and conservation councils. They also give technical assistance to producers and, as funding allows, help implement cost-share programs that leverage regional, state, and federal funds.

The OAWP will recruit producers within the Lakes Harney and Monroe and MSJR Basin to enroll in adopted BMP programs applicable to their operations. OAWP staff and contractors will identify existing growers, to the greatest extent possible, with the help of grower associations, information on county agricultural exemptions, field staff knowledge, and other means. Staff/contractors will assist producers in selecting the appropriate BMPs, with emphasis on nutrient management, irrigation management, sediment/erosion control, stormwater management, and record keeping.

5.4.3.2 Follow Up and Reporting on BMP Enrollment and Implementation

In addition to enrolling targeted operations in the relevant BMP programs, the OAWP will:

- *Document the submitted NOIs, which will include a list of the BMPs to be implemented.*
- *Document the amount of total agricultural acreage covered by the NOIs.*
- *Assist growers in understanding and implementing BMPs properly.*
- *On a rotating basis by program, mail written surveys to all operations in the Lakes Harney and Monroe and MSJR Basin under an active FDACS NOI, to evaluate BMP implementation and update information on ownership, land use, acreage, etc.*
- *Through regional field staff and contractors, follow up on identified areas/operations of particular concern.*

- *Participate in annual BMAP reporting on enrollment efforts and estimated load reductions, new manuals adopted, and any new efforts planned.*

The FWRA requires that, where water quality problems are demonstrated despite the proper implementation of adopted agricultural BMPs, FDACS must re-evaluate the practices, in consultation with FDEP, and modify them if necessary. Continuing water quality problems will be detected through the BMAP monitoring component and other FDEP and SJRWMD activities. If a re-evaluation of the BMPs is needed, FDACS will also include SJRWMD and other partners in the process.

5.4.4 FDEP AND SJRWMD ROLES IN BMP IMPLEMENTATION

The FWRA states that nonpoint source dischargers who fail either to implement the appropriate BMPs or conduct water quality monitoring prescribed by FDEP or a water management district may be subject to enforcement action by either of those agencies.

5.4.5 BMP ENROLLMENT GOALS AND LOAD REDUCTION ESTIMATES

5.4.5.1 BMP Enrollment Goals

Table 24 summarizes the land use data figures for agriculture in the BMAP area, the acres addressed by BMP manuals, the acres enrolled in BMP programs, and the goal for enrolling additional agricultural acres in the basin. The acreage used to calculate the starting point agricultural nutrient load is based on 2004 land use information from the SJRWMD. Based on aerial imagery and local staff observation, FDACS adjusted these figures to more accurately reflect the current agricultural land use acreage. The FDACS-adjusted acreage shows approximately 70% less acreage for vegetable/row crops than indicated in the 2004 figures. In addition, some of the acreage is no longer in production and would not be necessary to enroll in BMPs. The enrollment goal is 90% of the adjusted agricultural acres in the first 5 years of BMAP implementation.

It is important to understand that even if all targeted agricultural operations are enrolled, not all of the acreage listed as agriculture in **Table 24** will be included in the enrollment figures. The NOIs will document the estimated total number of acres on which applicable BMPs are implemented, not the entire parcel acreage. This is because land use data can contain nonproduction acres (such as buildings, parking lots, and fallow acres) that will not be counted on the NOIs submitted to FDACS. There also may be significant amounts of acreage that do not need to be enrolled, such as lands that are not actively involved in commercial agriculture (operations conducted as a business). These areas are often low-density residential uses on large parcels of grassed land, or land that was but is no longer in commercial agricultural production. This information frequently is impossible to discern in the aerial photography interpretation process used to generate land use data. Local government or FDEP BMPs may address these noncommercial sources.

As of June 30, 2011, 7 producers within the Lakes Harney and Monroe and MSJR Basin had submitted NOIs covering about 4,695 acres to implement FDACS-adopted BMPs. The only aquaculture operation within the basin is participating in BMPs through the FDACS aquaculture certification program. No producers are conducting water quality monitoring in lieu of implementing BMPs at this time. **Figure 5** is a map of the acres enrolled in BMPs as of June 30, 2011.

TABLE 24: AGRICULTURAL ACREAGE, BMP ENROLLMENT, AND FUTURE ENROLLMENT GOALS FOR THE LAKES HARNEY AND MONROE AND MSJR BASIN

2004 SJRWMD LAND USE	2004 ACRES	FDACS ADJUSTED ACRES[1]	RELATED FDACS BMP PROGRAMS	ACREAGE ENROLLED*	RELATED NOIS
Pasture	15,901.1	15,901.1	Cow/Calf; Future (hay)	4,450.0	1
Row/Field/Mixed Crops	2,862.8	825.6	Vegetable/Agronomic Crops	0.0	N/A
Fallow Cropland	1.7	1.7	No enrollment needed	N/A	N/A
Horse Farm[2]	174.1	174.1	Future Equine	N/A	N/A
Citrus	450.1	450.1	Ridge Citrus; Flatwoods Citrus	107.5	2
Abandoned Citrus	633.9	0.0	No enrollment needed	N/A	N/A
Tree Crops	13.3	13.3	Specialty Fruit and Nut	0.0	N/A
Tree Nurseries	76.5	76.5	Future Nursery; Specialty Fruit and Nut	0.0	N/A
Ornamentals	243.0	243.0	Container Nursery	125.0	3
Shade Ferns	0.6	0.6	Future Nursery	N/A	N/A
Hammock Ferns	2.4	2.4	Future Nursery	N/A	N/A
Specialty Farms	2.2	2.2	Conservation Plan Rule	0.0	N/A
Cattle Feeding	11.3	11.3	Conservation Plan Rule	0.0	N/A
Poultry Feeding[3]	80.9	80.9	Conservation Plan Rule	0.0	N/A
Other Open Lands – Rural	0.1	0.0	No enrollment needed	N/A	N/A
Aquaculture	*12.5*	*12.5*	*FDACS Aquaculture Division*	*12.5*	*1*
Total	**20,466.6**	**17,795.3**	**N/A**	**4,695.0**	**7**
5-Year Enrollment Goal[4] (90%)	**N/A**	**16,015.8**	**N/A**	**N/A**	**N/A**
Acreage Enrolled	**N/A**	**4,695.0**	**N/A**	**N/A**	**N/A**
Remaining Acres to Enroll[4]	**N/A**	**11,320.8**	**N/A**	**N/A**	**N/A**

TBD – To be determined

[1] FDACS staff-adjusted acreage for purposes of enrollment is based on a review of more recent aerial imagery in the basin and local staff observations.

[2] Most of these horse farms are likely not commercial agriculture, and will be addressed through FDEP-developed BMPs.

[3] FDACS staff have observed no active poultry operations in the BMAP area, but will confirm this.

[4] Please see the discussion in **Section 5.4.5.1**.

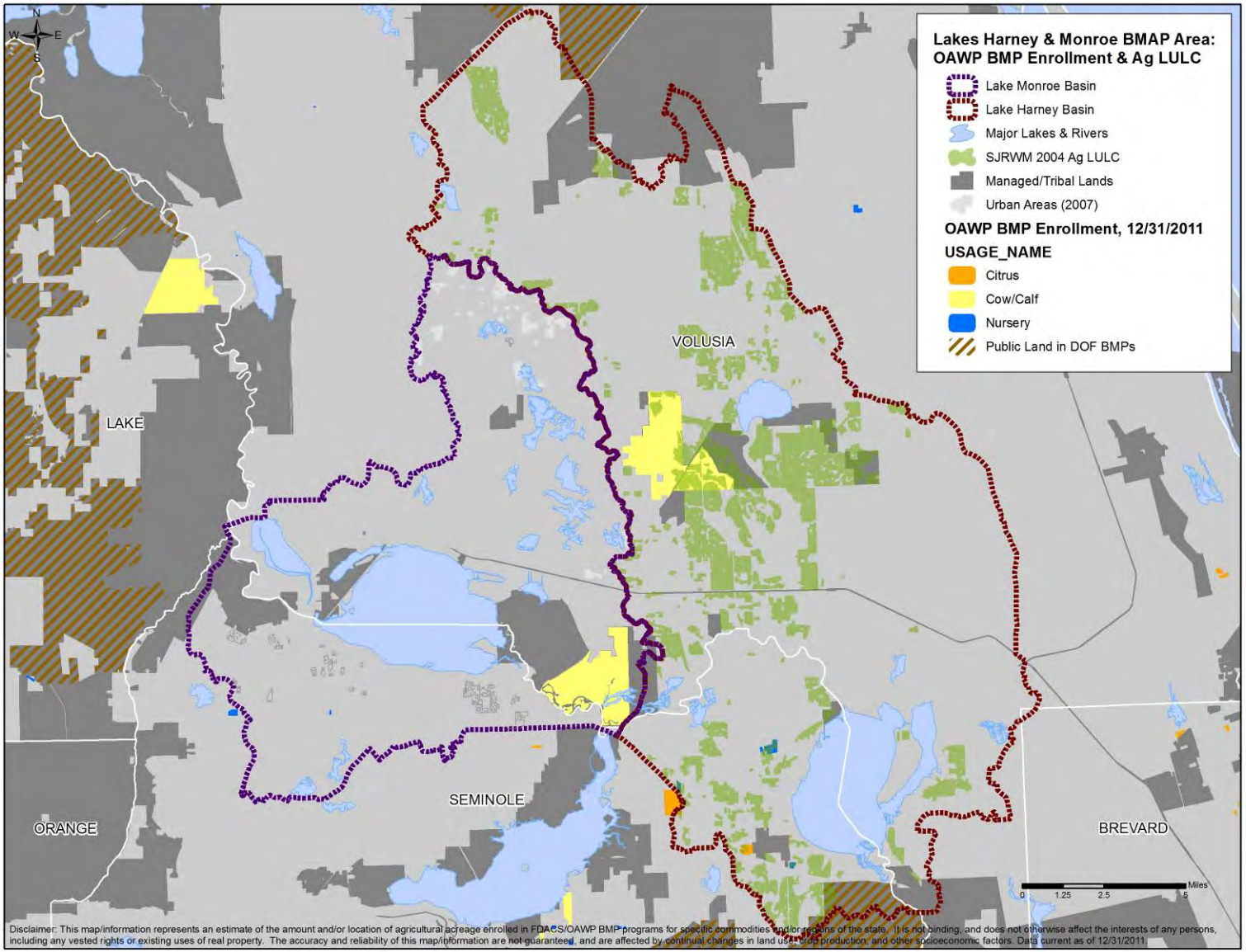

FIGURE 5: BMP ENROLLMENT IN THE LAKES HARNEY AND MONROE AND MSJR BASIN AS OF JUNE 30, 2011

5.4.5.2 Agricultural Load, Load Reduction Allocation, and BMP Load Reduction Estimates

Table 25 contains the reductions required of agricultural land uses in the Lakes Harney and Monroe and MSJR Basin. Due to the inaccuracies in 2004 land use information, changes in land use since 2004, and the agricultural acres contained in the noncontributing basin, the estimated total load for agriculture is greater than the actual loading. Consequently, **Table 25** also includes a reduction "credit" for agriculture to account for changes in land uses.

The region is expected to have continuing shifts from agricultural to residential land uses, which will reduce the agricultural load further. More precise information will be incorporated into the next iteration of the TMDL, and the estimated agricultural load will be adjusted to reflect the updated acreage figure. The potential refinement of a basin- and commodity-specific agricultural loading/reduction model should be considered during the first BMAP cycle.

The estimates of agricultural load reduction due to the implementation of BMPs, shown in **Table 25**, are based on commodity-specific methods developed for the Lake Okeechobee watershed because methods specific to the Lakes Harney and Monroe and MSJR Basin have not been developed. These values may assume conditions, such as typical phosphorus fertilization rates, that differ from actual field conditions, but are the best available information.

TABLE 25: AGRICULTURAL TN AND TP LOAD REDUCTION ALLOCATIONS, AND ESTIMATED REDUCTIONS IN TN AND TP LOADS IN THE FIRST 5 YEARS

ESTIMATED LOADS	TN (LBS/YR)	TP (LBS/YR)
Load Reduction Allocation	42,281.9	13,770.2
50% of Required Reductions (BMAP 1 Reductions)	*21,141.0*	*6,885.1*
Estimated Load Reductions via BMPs, 90% Enrollment	19,962.9	3,349.3
Reductions from Land Use Changes	15,043.1	2,953.3
Reductions from Non-Contributing Area	1,416.6	241.4
Total Estimated Load Reductions	*36,422.6*	*6,544.0*
Remaining Load Reductions Needed for BMAP 1	**-15,281.6 (credit)**	**341.1**

5.4.5.3 Beyond BMPs

Under the FWRA, when FDEP adopts a BMAP that includes agriculture, it is the agricultural producer's responsibility to implement water quality BMPs adopted by FDACS and verified as effective by FDEP in helping to achieve load reductions. If acreage adjustments and BMP implementation do not fully account for the current agricultural load reduction allocation, it will be necessary to develop and implement cost-assisted field- and/or regional-level treatment options that remove nutrients from farm discharges. In that case, FDACS will work with FDEP and the SJRWMD to identify appropriate options for achieving further agricultural load reductions.

CHAPTER 6: ASSESSING PROGRESS AND MAKING CHANGES

Successful BMAP implementation requires commitment and follow-up. In the Commitment to Plan Implementation (see **Chapter 7**), stakeholders have expressed their intention to carry out the plan, monitor its effect, and continue to coordinate within and across jurisdictions to achieve water quality targets. The FWRA requires that an assessment be conducted every 5 years to determine whether there is reasonable progress in implementing the BMAP and achieving pollutant load reductions. This chapter contains the water quality monitoring component sufficient to make this evaluation.

6.1 WATER QUALITY MONITORING

The Lakes Harney and Monroe and MSJR BMAP monitoring plan is designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. This information will measure progress toward achieving the TMDLs and provide a better understanding of the watershed loading. Sampling stations, parameters, frequency, and other elements of this strategy may be modified as appropriate to match changing environmental conditions and funding resources. However, any modifications made shall not affect the ability of the monitoring network to fulfill the objectives noted below.

6.1.1 OBJECTIVES

Focused objectives are critical for a monitoring plan to provide the information needed to evaluate implementation success. The primary and secondary objectives of the monitoring plan for the Lakes Harney and Monroe and MSJR Basin are described below. Primary objectives are necessary to evaluate success of the BMAP. Secondary objectives contribute to this evaluation, can help interpret data collected, and provide information for potential future refinements of the TMDL and/or BMAP.

- ***Primary Objective*** *– Track inputs and trends in TN and TP loads in the major tributaries and Smith Canal.*
- ***Secondary Objective*** *– Identify areas within the watershed with high loadings of nutrients to better focus management efforts.*

6.1.2 WATER QUALITY INDICATORS AND RESOURCE RESPONSES

To achieve the objectives above, the monitoring plan focuses on two types of indicators to track water quality trends: core and supplemental (**Table 26**). The core indicators are directly related to the parameters causing impairment in the Lakes Harney and Monroe and MSJR Basin. Supplemental indicators are monitored primarily to support the interpretation of core water quality parameters. At a minimum, the core parameters will be tracked to determine progress towards meeting the TMDL. The water quality parameters for the tributaries are shown in **Table 26** and the water quality parameters for the lakes are shown in **Table 27**.

TABLE 26: CORE AND SUPPLEMENTAL PARAMETERS FOR TRIBUTARIES MONITORING

CORE PARAMETERS	SUPPLEMENTAL PARAMETERS
Total phosphorus (as P)	Total suspended solids
Orthophosphate as P	Biochemical oxygen demand
Nitrate/nitrite as N	Chlorophyll-a
Total Kjeldahl nitrogen (TKN)	Ammonium

Core Parameters	Supplemental Parameters
Dissolved oxygen	Color
Temperature	-
Specific conductance	-
pH – field	-

Table 27: Core and Supplemental Parameters for Lakes Monitoring

Core Parameters	Supplemental Parameters
Total phosphorus (as P)	Total suspended solids
Orthophosphate as P	Biochemical oxygen demand
Nitrate/nitrite as N	-
Total Kjeldahl nitrogen (TKN)	-
Dissolved oxygen	-
Temperature	-
Specific conductance	-
pH – field	-
Chlorophyll-a	-

In addition to the water quality parameters, resource responses to BMAP implementation will be monitored (see **Section 6.1.4**). The resource responses represent improvements in the overall ecological health of the waterbodies. As noted earlier, although nutrient reductions in the watershed are expected to occur over a relatively short period of time, the water quality of the impaired waterbodies will not improve until reductions are made in the upstream sources.

6.1.3 Monitoring Network

The monitoring network for this plan builds upon existing efforts in the basin by:

- *City of Deltona;*
- *Seminole County;*
- *SJRWMD;*
- *Volusia County; and*
- *U.S. Geological Survey (USGS).*

Table 28 lists the stations that are included in the BMAP monitoring network. The water quality monitoring will be conducted on a monthly basis to assess the conditions in the watershed and within the lakes and tributaries to determine changes in water quality from the actions implemented as part of the BMAP. The stations in the monitoring network are also shown in **Figure 6** through **Figure 8**.

Table 28: BMAP Monitoring Network

Entity	Station ID	Station Description	Year Site Established	Station Type
Deltona	Gleason1	Gleason Basin Outfall	2011	Water Quality
Deltona	Providence1	Providence Basin Outfall	2011	Water Quality
Deltona	McGarity1	McGarity Basin Outfall	2011	Water Quality
Seminole County	1014	Smith Canal (SMI)	2000	Water Quality

Entity	Station ID	Station Description	Year Site Established	Station Type
Sanford/Seminole County	Mill1	Mills Creek Outfall to Monroe	2012	Water Quality
SJRWMD	LA-OW-S	Lake Ashby open water	2003	Water Quality
SJRWMD	SJR-415	St. Johns River at 415 Bridge at Sanford	2002	Water Quality
SJRWMD	SJR-DPP	St. Johns River downstream of Power Plant	2002	Water Quality
SJRWMD	SJR-OLH	Lake Harney Outfall - St. Johns River	2002	Water Quality
SJRWMD	SRN	Lake Harney inflow - St. Johns River at SR46 Bridge	1982	Water Quality
SJRWMD*	DCD-MRD	Deep Creek Diversion at Maytown Road	2011	Water Quality
SJRWMD	OW-SJR-1	Mid SJR east of Barge Canal and east of JJ Fish Camp	1996	Water Quality
SJRWMD	CLH	Center of Lake Harney	2001	Water Quality
SJRWMD	DMR	Deep Creek at Maytown Road	1985	Water Quality
SJRWMD	LMAC	Lake Monroe at Center	1991	Water Quality
Volusia County	VC-044	St. Johns River, at Lemon Bluff	2005	Water Quality
Volusia County	VC-047A	St. Johns River, S. end of Lake Monroe	2012	Water Quality
Volusia County*	VC-092	DC3 Lake Ashby Canal at Maytown Rd	2003	Water Quality
Volusia County	VC-DC04	DC4 Deep Creek	2005	Water Quality
Volusia County	VC-DC05	DC5 Deep Creek	2005	Water Quality
Volusia County	VC-COW	Cow Creek	2012	Water Quality
Volusia County	VC-082	Gemini North (west boil)	2000	Water Quality
Volusia County	VC-083	Gemini Springs outfall	2000	Water Quality
Volusia County	VC-084	Volusia Green Springs	2000	Water Quality
USGS	2234000	St. Johns River Above Lake Harney near Geneva, FL	1981	Flow
USGS	2234500	St. Johns River Near Sanford, FL	1995	Flow

* Note: These stations are located in the same location and will each be sampled bi-monthly.

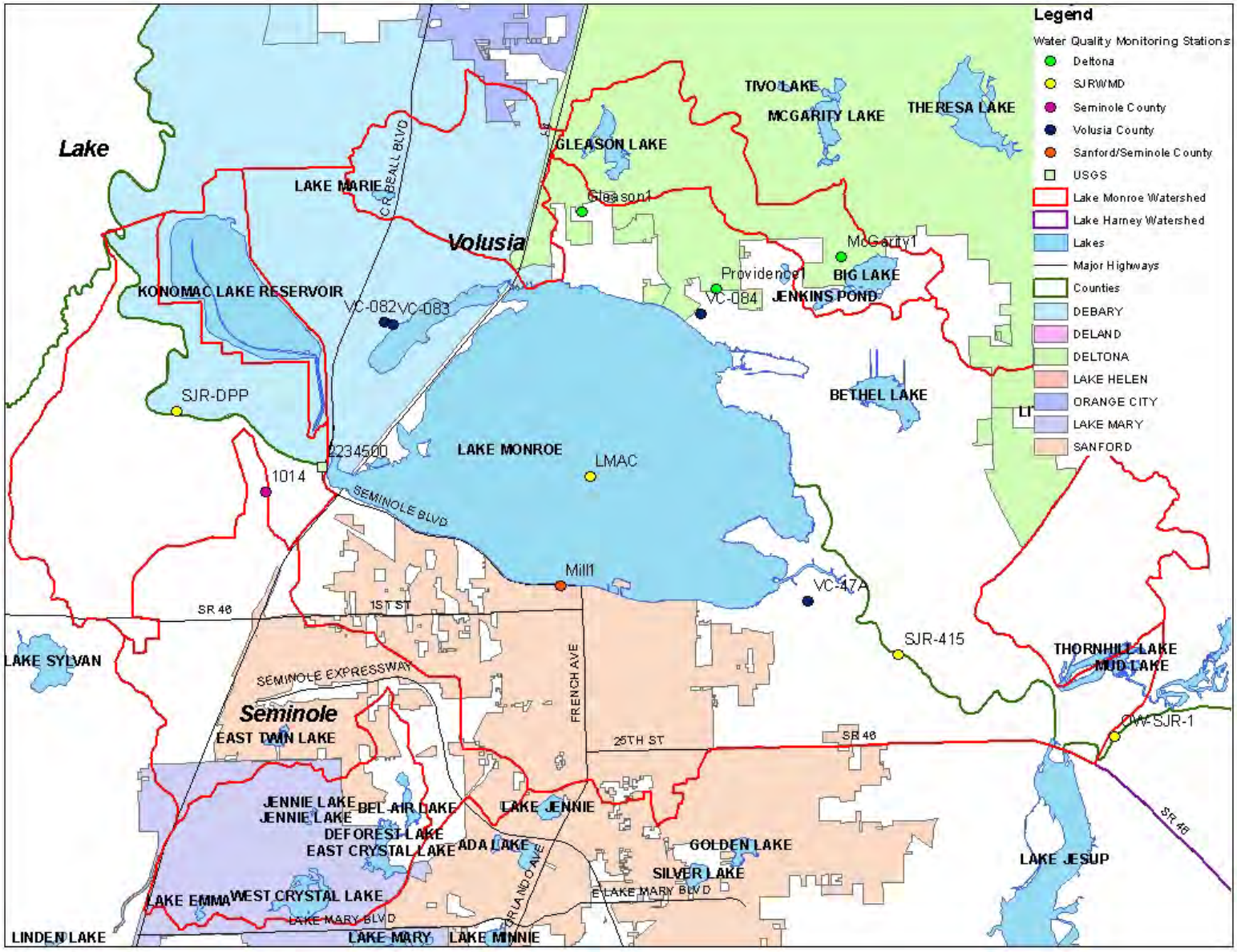

FIGURE 6: WATER QUALITY MONITORING STATIONS IN THE LAKE MONROE BASIN

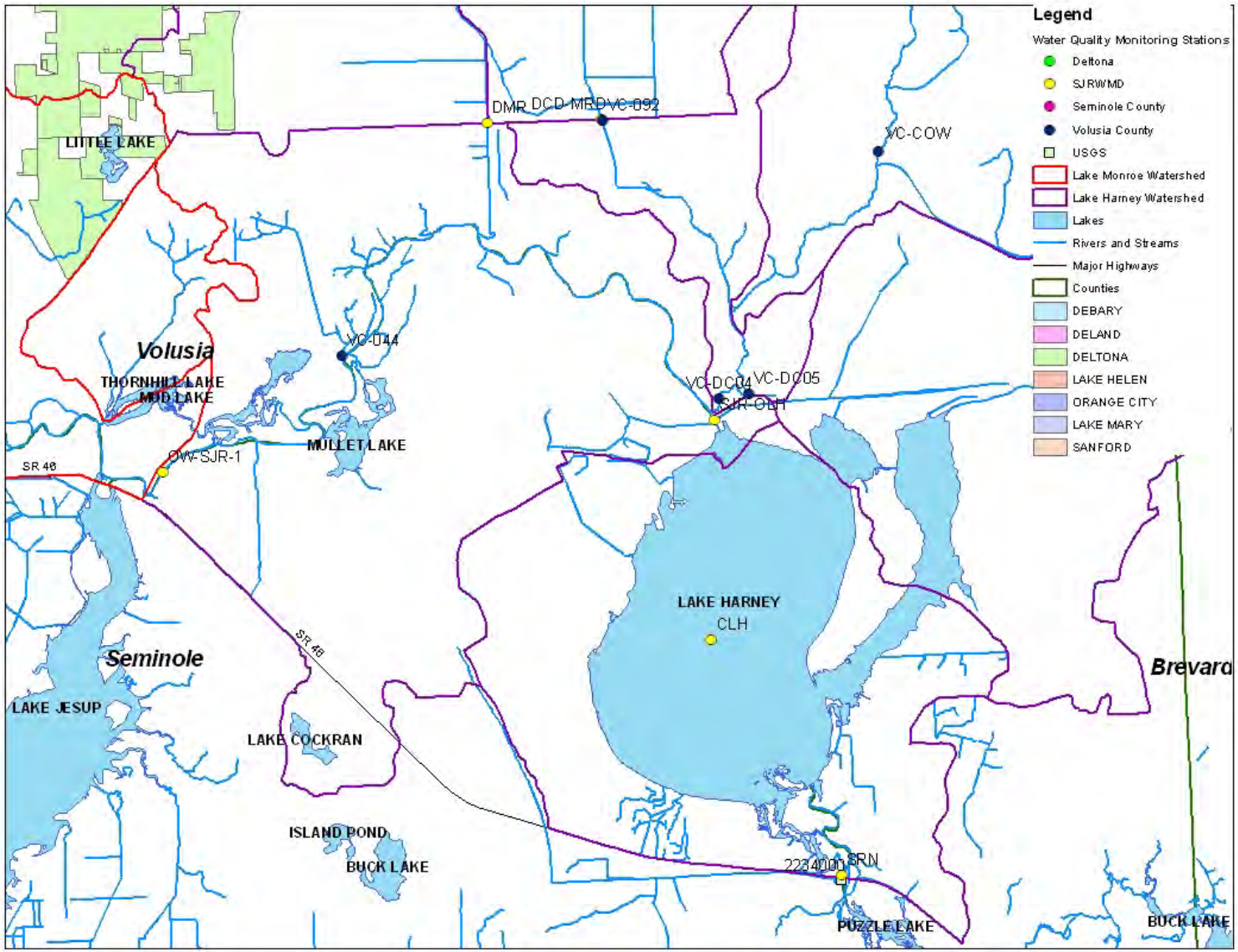

FIGURE 7: WATER QUALITY MONITORING STATIONS IN THE SOUTHERN LAKE HARNEY BASIN

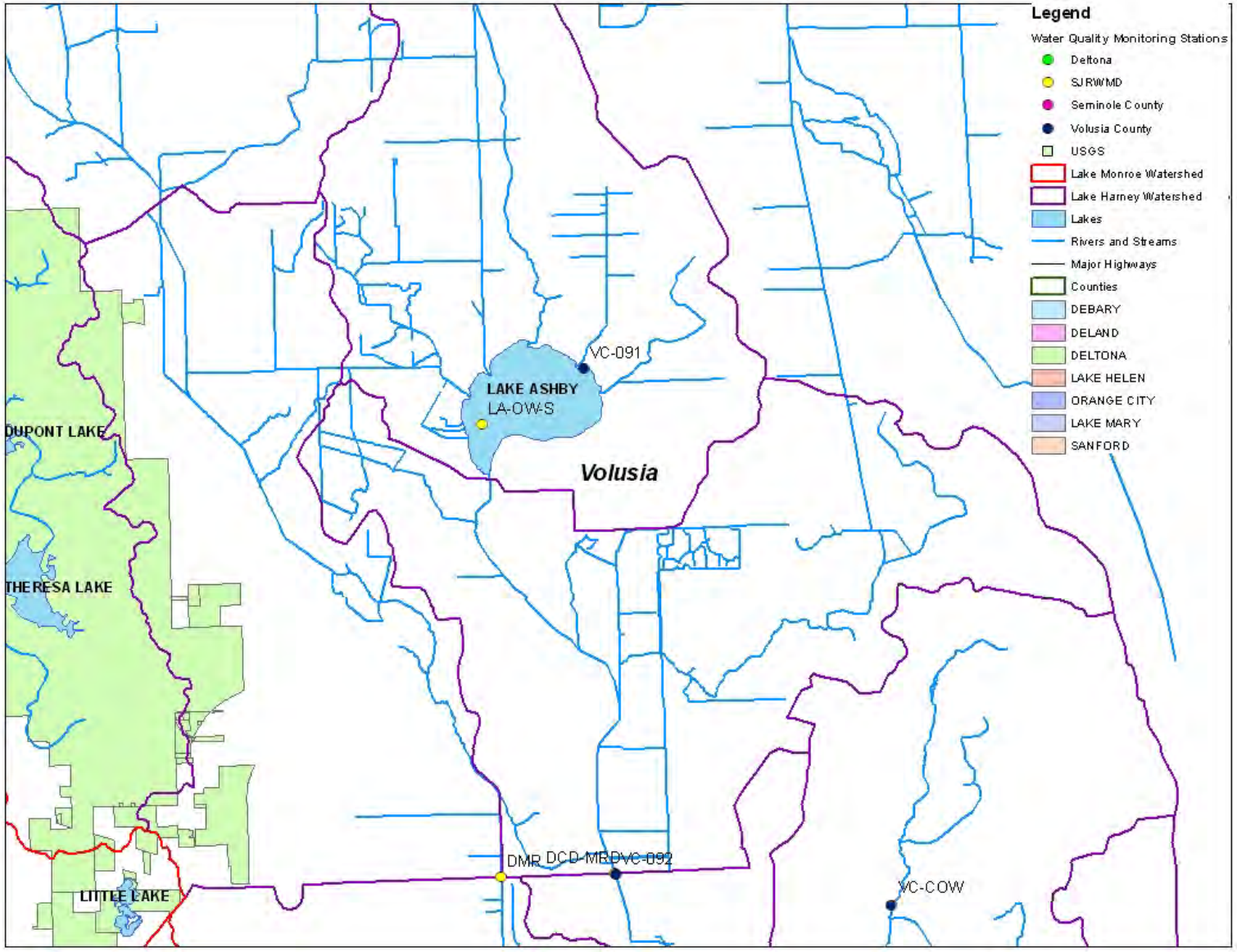

FIGURE 8: WATER QUALITY MONITORING STATIONS IN THE NORTHERN LAKE HARNEY BASIN

6.1.4 BIOLOGICAL AND VEGETATION MONITORING

Bioassessments are desirable tools for detecting the severity of impairments affecting the flora and/or fauna of a waterbody. As water chemistry results provide detailed information regarding the health of a waterbody at a specific time, bioassessment results reflect the health of the biological communities within the waterbody over a longer period of time. Seminole County employs various FDEP designed bioassessment tools to detect changes in these biological communities, as described below.

The Lake Vegetation Index (LVI) is a multi-metric index that evaluates how closely a lake's plant community resembles one that has very little human disturbance. Lake Harney has been monitored annually using the LVI in 2005, and 2007-2011. Lake Monroe is likewise monitored annually for the period of 2008-2011.

The Lake Condition Index (LCI) is also a multi-metric index that is based on the macroinvertebrate assemblage within a lake with "best available" conditions upon which comparisons can be made to assess the health of the lake being monitored. LCIs have been performed on Lake Harney in 2003-2008 and 2010. Lake Monroe was monitored using this tool in 2008 and 2010. After collecting years of LCI data, recent research led FDEP to come to the conclusion that this tool was not exposing human disturbance as well as had been expected. Seminole County continues to use the LCI for establishing health trends in lakes. However, collecting and assessing benthic macroinvertebrates in lakes using the conventional methods, such as the basic Shannon-Weaver Index, have been added to the monitoring program. Lake Harney and Lake Monroe were both sampled once during 2011 using the Shannon-Weaver Index.

The Stream Condition Index (SCI) is another multi-metric tool that assesses the macroinvertebrate communities and compares the results to "minimally disturbed" reference sites. Seminole County's monitoring site on Smith Canal was assessed annually for the period of 2007-2009, and will be monitored again in 2012.

Seminole County also conducts lake assessments on a routine basis, usually quarterly, for Lakes Harney and Monroe to assess and document the condition of the waterbody and aquatic plant management activities. In addition to specific lake management strategies, long and short term trends are developed using these assessments, which includes tracking aquatic vegetation types, growth rate, diversity of species (flora and fauna), native and non-native species, clarity, and overall health. Lake assessments are performed in compliance with state and federal standards and methodologies by certified professional Seminole County Lake Management Program staff and results are provided in a narrative report distributed to the regulatory agencies within the MSJR Basin.

SJRWMD also conducts monthly sampling and analysis of phytoplankton at 7 stations in the watershed. This sampling started in 2002 for most stations and in 2003 for the Lake Monroe and Lake Ashby stations and will continue as long as budget for this effort is available.

The biological and vegetation monitoring conducted by Seminole County and SJRWMD is listed in **Table 29** and shown in **Figure 9**.

TABLE 29: BIOLOGICAL AND VEGETATION MONITORING

ENTITY	STATION NAME	YEAR SITE ESTABLISHED	END DATE	STATION TYPE	SAMPLING PARAMETERS
Seminole County	Lake Harney North (HRN-N)	2003	2010	LCI	Macroinvertebrates
Seminole County	Lake Harney South (HRN-S)	2003	2010	LCI	Macroinvertebrates

Entity	Station Name	Year Site Established	End Date	Station Type	Sampling Parameters
Seminole County	Lake Monroe North (MONN)	2008	2010	LCI	Macroinvertebrates
Seminole County	Lake Monroe South (MONS)	2008	2010	LCI	Macroinvertebrates
Seminole County	Lake Harney North (HRN-N)	2011	Ongoing	Shannon-Weaver	Macroinvertebrates
Seminole County	Lake Harney South (HRN-S)	2011	Ongoing	Shannon-Weaver	Macroinvertebrates
Seminole County	Lake Monroe North (MONN)	2011	Ongoing	Shannon-Weaver	Macroinvertebrates
Seminole County	Lake Monroe South (MONS)	2011	Ongoing	Shannon-Weaver	Macroinvertebrates
Seminole County	Lake Harney (HRN)	2005	Ongoing	LVI	Vegetation index, submersed, and shoreline
Seminole County	Lake Monroe (MON)	2008	Ongoing	LVI	Vegetation index, submersed, and shoreline
Seminole County	Lake Harney (HRN)	2007	Ongoing	Lake Assessment	Whole lake vegetation data; secchi
Seminole County	Lake Monroe (MON)	2007	Ongoing	Lake Assessment	Whole lake vegetation data; secchi
Seminole County	Smith Canal (SMI)	2007	Ongoing	SCI	Macroinvertebrates
SJRWMD	Lake Monroe at Center (LMAC)	2003	Ongoing	Biological	Phytoplankton
SJRWMD	St. Johns River at 415 Bridge at Sanford (SJR-415)	2002	Ongoing	Biological	Phytoplankton
SJRWMD	Mid SJR east of Barge Canal and east of JJ Fish Camp (OW-SJR-1)	2002	Ongoing	Biological	Phytoplankton
SJRWMD	Center of Lake Harney (CLH)	2002	Ongoing	Biological	Phytoplankton
SJRWMD	Lake Ashby open water (LA-OW-S)	2003	Ongoing	Biological	Phytoplankton
SJRWMD	Lake Harney inflow – St. Johns River at SR46 Bridge (SRN)	2002	Ongoing	Biological	Phytoplankton

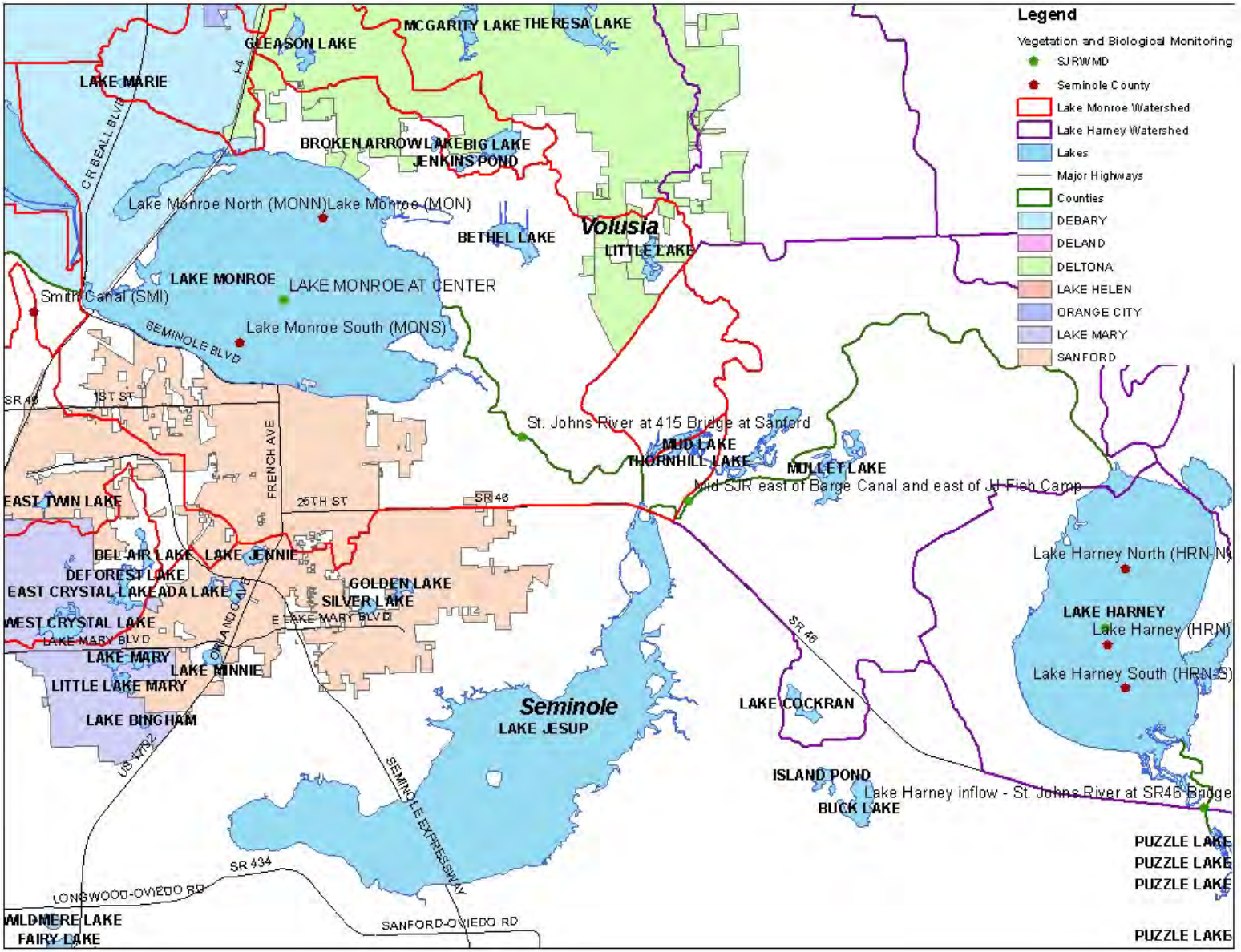

FIGURE 9: BIOLOGICAL AND VEGETATION MONITORING STATIONS IN THE LAKES HARNEY AND MONROE AND MSJR BMAP

6.1.5 Data Management and Assessment

The Florida STORET database serves as the primary repository of ambient water quality data for the state of Florida. FDEP pulls water quality data used for impaired water evaluations and TMDL development directly from the STORET database. Ambient water quality data collected as part of the BMAP will be uploaded into STORET for long-term storage and availability. SJRWMD, FDEP, and some local stakeholders currently upload water quality data into STORET. All BMAP data providers have agreed to upload ambient water quality data to STORET at least once every six months, upon completion of the appropriate quality assurance/quality control (QA/QC) checks.

Other data, such as biological and storm event, may also be collected and the STORET database is not equipped to store these types of data. Stakeholders agree to provide these data to other BMAP partners upon request and when appropriate for inclusion in BMAP data analyses and adaptive management evaluations.

The water quality data will be analyzed after four years of BMAP implementation to determine trends in water quality in the lakes and their tributaries. A wide variety of statistical methods are available for trend analyses. The selection of an appropriate data analysis method depends on the frequency, spatial distribution, and period of record available from existing data. Specific statistical analyses were not identified during BMAP development; however, commonly accepted methods of data analysis will be used that are consistent with the TMDL model.

6.1.6 Quality Assurance/Quality Control

Stakeholders participating in the monitoring plan must collect water quality data in a manner consistent with FDEP's SOPs for QA/QC. The most current version of these procedures can be downloaded from http://www.dep.state.fl.us/water/sas/sop/sops.htm. For BMAP-related data analyses, entities should use National Environmental Laboratory Accreditation Council (NELAC) National Environmental Laboratory Accreditation Program (NELAP) certified laboratories (http://www.dep.state.fl.us/labs/cgi-bin/aams/index.asp) or other labs that meet the certification and other requirements outlined in the SOPs. SJRWMD staff and contractors collect, process, and preserve samples according to the SJRWMD's Standard Operating Procedures for the Collection of Surface Water Quality Samples and Field Data–Feb. 13, 2004. Where SJRWMD and FDEP SOP's do not correspond to one another, SJRWMD staff and contractors defer to FDEP's SOPs.

6.2 Tracking Implementation

FDEP will work with the stakeholders to organize the monitoring data and track project implementation. This information will be presented in an annual report. The technical stakeholders will meet at least every 12 months after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues. The following types of activities may occur at annual meetings:

- *Implementation Data and Reporting*
  - Collect project implementation information from the stakeholders and MS4 permit reporting and compare with the BMAP schedule.
  - Discuss the data collection process, including any concerns and possible improvements to the process.
  - Review the monitoring plan implementation, as detailed in **Section 6.1**.

- *Sharing New Information*
  - Report on results from water quality monitoring and trend information.
  - Provide updates on new projects and programs in the basin that will help reduce nutrient loading.
  - Identify and review new scientific developments on addressing nutrient loading and incorporate any new information into annual progress reports.
  - Discuss new sampling technologies that will improve source identification.
  - Provide updates to the stakeholders on HSPF model modifications to validate assumptions.

- *Coordinating TMDL-Related Issues*
  - Provide updates from FDEP on the basin cycle and activities related to any impairments, TMDLs, and BMAP.
  - Obtain reports from other basins where tools or other information may be applicable to the Lakes Harney and Monroe and MSJR TMDLs.

Covering all of these topics is not required for the annual meetings, but they provide examples of the types of information that should be considered for the agenda to assist with BMAP implementation and improve coordination among the agencies and stakeholders.

6.3 ADAPTIVE MANAGEMENT MEASURES

Adaptive management involves setting up a mechanism for making adjustments in the BMAP when circumstances change or feedback indicates the need for a more effective strategy. Adaptive management measures include the following:

- *Procedures to determine whether additional cooperative strategies are needed;*
- *Criteria/processes for determining whether and when plan components need revision due to changes in costs, environmental impacts, social effects, watershed conditions, or other factors; and*
- *Descriptions of the stakeholders' role after BMAP completion.*

Key components of adaptive management to share information and expertise are tracking plan implementation, monitoring water quality and pollutant loads, and holding periodic meetings.

BMAP execution will be a long-term process. Some key projects with significant source reductions will extend beyond the first 5 years of BMAP cycle. FDEP and the stakeholders will track implementation efforts and monitor water quality to measure effectiveness and ensure BMAP compliance. The stakeholders will meet at least every 12 months to discuss implementation issues, consider new information, and, if the Lakes Harney and Monroe and MSJR Basin is not projected to meet the TMDLs, determine additional corrective actions. Project implementation as well as monitoring and other activities status will be collected annually from the participating entities. The stakeholders will review these reports to assess progress towards meeting the BMAP's goals.

CHAPTER 7: COMMITMENT TO PLAN IMPLEMENTATION

Section 403.067(7), F.S., lays out the mechanisms for BMAP implementation (see **Appendix B**). While the BMAP is linked by statute to permitting and other enforcement processes that target individual entities, successful implementation mandates that local stakeholders willingly and consistently work together to attain adopted TMDLs. This collaboration fosters the sharing of ideas, information, and resources. The stakeholders have demonstrated their willingness to confer with and support each other in their efforts.

FDEP will ask for letters of commitment or resolutions of support for the BMAP from the entities to ensure that as staff and board members change over time, the entity has a way to show support for the BMAP and the efforts included. This process will occur concurrently with BMAP adoption, and the written statements of commitment will be added to this chapter of the BMAP as they are received.

LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN MANAGEMENT ACTION PLAN 2012

STATEMENT OF COMMITMENT TO SUPPORT PLAN IMPLEMENTATION

The Lakes Harney and Monroe and Middle St. Johns River (MSJR) Basin Management Action Plan (BMAP) to be completed on March 15, 2012, as developed by the agencies and organizations listed as stakeholders in the Lakes Harney and Monroe and MSJR BMAP watershed.

The City of DeBary, as a stakeholder of the BMAP, agrees that, as applicable, it will:

- Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.
- Support the necessary approvals and funding needed to implement the management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.
- Track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.
- Identify and advise the Florida Department of Environmental Protection (FDEP) of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.
- As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy.
- Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.

Organization: **City of DeBary**

Authorized Name/Title **Bob Garcia, City Mayor**

Signature: Bob Garcia

Date: 6 Mar 2012

LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN MANAGEMENT ACTION PLAN 2012

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Organization: City of DeBary

Authorized Name/Title: Bob Garcia, City Mayor

Signature: Bob Garcia Date: 6 Mar 2012

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Organization: City of DeHonn

Authorized Name/Title (print): Faith 6. Miller

Faith 6. Miller, City Manager

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- As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy.
- Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.

Organization: City of Deltona

Authorized Name/Title: Faith G. Miller, City Manager

LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN MANAGEMENT ACTION PLAN 2012

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- Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.
- Support the necessary approvals and funding, if available, needed to implement the management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.
- Track the implementation of management actions for which the City is responsible for to assure that the BMAP is carried out.
- Identify and advise the Florida Department of Environmental Protection (FDEP) of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.
- Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.

Organization: CITY OF SANFORD

Authorized Name/Title (print): BILAL IFTIKHAR / INTERIM DIRECTOR OF PUBLIC WORKS

LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN MANAGEMENT ACTION PLAN 2012

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- Support the necessary approvals and funding needed to implement the management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.

- Track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.

- Identify and advise the Florida Department of Environmental Protection (FDEP) of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.

- Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.

Organization: City of Sanford

Authorized Name/Title (print): Bilal Iftikhar/Interim Director of Public Works

St. Johns River
Water Management District
Hans G. Tanzler III, Executive Director

4049 Reid Street • P.O. Box 1429 • Palatka, FL 32178-1429 • (386) 329-4500
On the Internet at floridaswater.com.

June 1, 2012

The Honorable Herschel T. Vinyard, Jr., Secretary
The Florida Department of Environmental Protection
3900 Commonwealth Boulevard, M.S. 49
Tallahassee, FL 32399

Re: Draft Lakes Harney and Monroe and Middle St. Johns River Basin Management Action Plan
Statement of Commitment to Support Plan Implementation

Dear Secretary Vinyard:

As you are aware, the Florida Department of Environmental Protection (DEP) has obtained endorsement of the Draft Lakes Harney and Monroe and Middle St. Johns River Basin Management Action Plan (BMAP). The middle St. Johns River in Central Florida includes riverine segments and flows through lakes Harney and Monroe, which are wide sections of the river's main stem. This stretch of river is impaired by high levels of total nitrogen and total phosphorus (DEP, Verified Impaired Waters). The focus of the BMAP requires reductions from external total phosphorus and total nitrogen sources. The total required reductions are allocated to the responsible entities in the basin.

The St. Johns River Water Management District, as a member of the Middle St. Johns River Basin Working Group, supports the BMAP, as indicated in the attached Statement of Commitment to Support Plan Implementation.

Sincerely,

Hans G. Tanzler III
Executive Director

Attachment

c. Casey Fitzgerald

DRAFT LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN MANAGEMENT ACTION PLAN 2012

STATEMENT OF COMMITMENT TO SUPPORT PLAN IMPLEMENTATION

The Draft Lakes Harney and Monroe and Middle St. Johns River Basin Management Action Plan (BMAP) was developed by the agencies and organizations listed as stakeholders within the BMAP and was completed on March 15, 2012.

The stakeholders of the BMAP agree that, as applicable, their organizations will:

- Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.
- Support acquiring the necessary approvals and funding needed to implement the management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.
- Track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.
- Identify and advise the Florida Department of Environmental Protection (DEP) of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.
- As practicable, assist with water quality monitoring according to the BMAP monitoring strategy.
- Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.

St. Johns River Water Management District

Hans G. Tanzler III,	**Executive Director**	**Date** 6/31/12

St. Johns River Water Management District

June 1, 2012

The Honorable Herschel T. Vinyard, Jr., Secretary
The Florida Department of Environmental Protection
3900 Commonwealth Boulevard, M.S. 49
Tallahassee, FL 32399

Re: Draft Lakes Harney and Monroe and Middle St. Johns River Basin Management Action Plan
Statement of Commitment to Support Plan Implementation

Dear Secretary Vinyard:

As you are aware, the Florida Department of Environmental Protection (DEP) has obtained endorsement of the Draft Lakes Harney and Monroe and Middle St. Johns River Basin Management Action Plan (BMAP). The middle St. Johns River in Central Florida includes riverine segments and flows through lakes Harney and Monroe, which are wide sections of the river's main stem. This stretch of river is impaired by high levels of total nitrogen and total phosphorus (DEP, Verified Impaired Waters). The focus of the BMAP requires reductions from external total phosphorus and total nitrogen sources. The total required reductions are allocated to the responsible entities in the basin.

The St. Johns River Water Management District, as a member of the Middle St. Johns River Basin Working Group, supports the BMAP, as indicated in the attached Statement of Commitment to Support Plan Implementation.

Sincerely,

Hans G. Tanzler III
Executive Director

Attachment

c. Casey Fitzgerald

LAKES HARNEY AND MONROE AND MIDDLE ST. JOHNS RIVER BASIN MANAGEMENT ACTION PLAN 2012

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- Track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.
- Identify and advise the Florida Department of Environmental Protection (DEP) of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.
- As practicable, assist with water quality monitoring according to the BMAP monitoring strategy.
- Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.

St. Johns River Water Management District

Hans G. Tanzler II, Executive Director Date: 5/31/12

APPENDICES

APPENDIX A: TMDL BASIN ROTATION SCHEDULE

TMDLs are developed, allocated, and implemented through a watershed management approach (managing water resources within their natural boundaries) that addresses the state's 52 major hydrologic basins in five groups, on a rotating schedule. **Table A-1** shows the hydrologic basins within each of the five groups, with the FDEP District office of jurisdiction. **Table A-2** illustrates the repeating five-year basin rotation schedule.

TABLE A-1: MAJOR HYDROLOGIC BASINS BY GROUP AND FDEP DISTRICT OFFICE

FDEP DISTRICT	GROUP 1 BASINS	GROUP 2 BASINS	GROUP 3 BASINS	GROUP 4 BASINS	GROUP 5 BASINS
NW	Ochlockonee–St. Marks	Apalachicola–Chipola	Choctawhatchee–St. Andrews Bay	Pensacola Bay	Perdido Bay
NE	Suwannee	Lower St. Johns	Not applicable	Nassau–St. Marys	Upper East Coast
Central	Ocklawaha	Middle St. Johns	Upper St. Johns	Kissimmee	Indian River Lagoon
SW	Tampa Bay	Tampa Bay Tributaries	Sarasota Bay–Peace–Myakka	Withlacoochee	Springs Coast
S	Everglades West Coast	Charlotte Harbor	Caloosahatchee	Fisheating Creek	Florida Keys
SE	Lake Okeechobee	St. Lucie–Loxahatchee	Lake Worth Lagoon–Palm Beach Coast	Southeast Coast–Biscayne Bay	Everglades

Each group will undergo a cycle of five phases on a rotating schedule:

Phase 1: Preliminary evaluation of water quality
Phase 2: Strategic monitoring and assessment to verify water quality impairments
Phase 3: Development and adoption of TMDLs for waters verified as impaired
Phase 4: Development of basin management action plan (BMAP) to achieve the TMDL
Phase 5: Implementation of the BMAP and monitoring of results

The Middle St. Johns River is a Group 2 basin and the Cycle 1 list of verified impaired waters was developed in 2004, and the Cycle 2 list was adopted in 2009. Subsequent TMDL and BMAP development is occurring on a schedule driven by the 1998 303(d) list (see http://www.dep.state.fl.us/water/tmdl/ for more information) and FDEP staff resource availability. FDEP will re-evaluate impaired waters every 5 years to determine whether improvements are being achieved and to refine loading estimates and TMDL allocations using new data. If any changes in a TMDL are required, the applicable TMDL rule may be revised. Changes to a TMDL would prompt revisions to the applicable BMAP, which will be revisited at least every 5 years and modified as necessary, regardless of whether the TMDL is modified.

APPENDIX B: SUMMARY OF STATUTORY PROVISIONS GUIDING BMAP DEVELOPMENT AND IMPLEMENTATION

SECTIONS 403.067(6) AND (7), FLORIDA STATUTES - *Summary of Excerpts*

ALLOCATIONS

- The TMDL shall include reasonable and equitable allocations of the TMDL between or among point and nonpoint sources that will alone, or in conjunction with other management and restoration activities, provide for the attainment of pollutant reductions established pursuant to paragraph (a) to achieve applicable water quality standards.
- The allocations may establish the maximum amount of the pollutant that may be discharged or released in combination with other discharges or releases.
- Allocations may also be made to individual basins and sources or as a whole to all basins and sources or categories of sources of inflow to the water body or water body segments.
- An initial allocation of allowable pollutant loads may be developed as part of the TMDL; in such cases detailed allocations to specific point sources and categories of nonpoint sources shall be established in the basin management action plan.
- The initial and detailed allocations shall be designed to attain pollutant reductions established pursuant to paragraph (a) and shall be based on consideration of:
    1. Existing treatment levels and management practices;
    2. Best management practices established and implemented pursuant to paragraph (7)(c);
    3. Enforceable treatment levels established pursuant to state or local law or permit;
    4. Differing impacts pollutant sources may have on water quality;
    5. The availability of treatment technologies, management practices, or other pollutant reduction measures;
    6. Environmental, economic, and technological feasibility of achieving the allocation;
    7. The cost benefit associated with achieving the allocation;
    8. Reasonable timeframes for implementation;
    9. Potential applicability of any moderating provisions such as variances, exemptions, and mixing zones; and
    10. The extent to which non-attainment of water quality standards is caused by pollution sources outside of Florida, discharges that have ceased, or alterations to water bodies prior to the date of this act.

GENERAL IMPLEMENTATION

- **DEP is the lead agency** in coordinating TMDL implementation, through existing water quality protection programs.
- **Application of a TMDL by a water management** district does not require WMD adoption of the TMDL.
- **TMDL implementation may include**, but is not limited to:
    - Permitting and other existing regulatory programs
    - Non-regulatory and incentive-based programs
    - Other water quality management and restoration activities, such as Surface Water Improvement and Management (SWIM) plans or **basin management action plans**
    - Pollutant trading or other equitable economically based agreements
    - Public works
    - Land acquisition

BASIN MANAGEMENT ACTION PLAN DEVELOPMENT

- DEP may develop a basin management action plan that addresses some or all of the

watersheds and basins tributary to a TMDL waterbody.

- A basin management action plan **shall**:
  - Integrate appropriate management strategies available to the state through existing water quality protection programs.
  - Equitably allocate pollutant reductions to individual basins, all basins, each identified point source, or category of nonpoint sources, as appropriate.
  - Identify the mechanisms by which potential future increases in pollutant loading will be addressed.
  - Specify that for nonpoint sources for which BMPs have been adopted, the initial requirement shall be BMPs developed pursuant to paragraph (c).
  - Establish an implementation schedule.
  - Establish a basis for evaluating plan effectiveness.
  - Identify feasible funding strategies.
  - Identify milestones for implementation and water quality improvement, and an associated water quality monitoring component to evaluate reasonable progress over time.
  - Be adopted in whole or in part by DEP Secretarial Order, subject to chapter 120.
- A basin management action plan **may**:
  - Give load reduction credits to dischargers that have implemented load reduction strategies (including BMPs) prior to the development of the BMAP. (*Note: this assumes the related reductions were not factored into the applicable TMDL*.)
  - Include regional treatment systems or other public works as management strategies.
  - Provide for phased implementation to promote timely, cost-effective actions.
- An assessment of progress in achieving milestones shall be conducted every 5 years and the basin management action plan revised, as appropriate, in cooperation with basin stakeholders, and adopted by secretarial order.
- DEP shall assure that key stakeholders are invited to participate in the basin management action plan development process, holding at least one noticed public meeting in the basin to receive comments, and otherwise encouraging public participation to the greatest practicable extent.
- A basin management action plan shall not supplant or alter any water quality assessment, TMDL calculation, or initial allocation.

BASIN MANAGEMENT ACTION PLAN IMPLEMENTATION

- NPDES Permits
  - Management strategies related to a discharger subject to NPDES permitting shall be included in subsequent applicable NPDES permits or permit modifications when the permit expires (is renewed), the discharge is modified (revised), or the permit is reopened pursuant to an adopted BMAP.
  - Absent a detailed allocation, TMDLs shall be implemented through NPDES permit conditions that include a compliance schedule. The permit shall allow for issuance of an order adopting the BMAP within five years. (***Note**: Intended to apply to individual wastewater permits – not MS4s*)
  - Once the BMAP is adopted, the permit shall be reopened, as necessary, and permit conditions consistent with the BMAP shall be established.
  - Upon request by a NPDES permittee, DEP may establish individual allocations prior to the adoption of a BMAP, as part of a permit issuance, renewal, or modification (revision).
  - To the maximum extent practicable, MS4s shall implement a TMDL or BMAP through the use of BMPs or other management measures.
  - A BMAP does not take the place of NPDES permits or permit requirements.
  - Management strategies to be implemented by a DEP permittee shall be completed according to the BMAP schedule, which may extend beyond the 5-year term of an NPDES permit.

- Management strategies are not subject to challenge under chapter 120 when they are incorporated in identical form into a NPDES permit or permit modification (revision).

- Management strategies assigned to nonagricultural, non-NPDES permittees (state, regional, or local) shall be implemented as part of the applicable permitting programs.
- Nonpoint source dischargers (e.g., agriculture) included in a BMAP shall demonstrate compliance with the applicable TMDLs by either implementing appropriate BMPs established under paragraph 7(c), or conducting water quality monitoring prescribed by **DEP or a WMD**. (***Note****: this is not applicable to MS4s, as they are considered point sources under the federal Clean Water Act and TMDL Program*.)
  - Failure to implement BMPs or prescribed water quality monitoring may be subject to **DEP or WMD** enforcement action.
- Responsible parties who are implementing applicable BMAP strategies shall not be required to implement additional pollutant load reduction strategies, and shall be deemed in compliance with this section. However, this does not limit DEP's authority to amend a BMAP.

BEST MANAGEMENT PRACTICES

- DEP, in cooperation with WMDs and other interested parties, may develop interim measures, BMPs, or other measures for non-agricultural nonpoint sources to achieve their load reduction allocations.
  - These measures may be adopted by **DEP or WMD** rule. If adopted, they shall be implemented by those responsible for non-agricultural nonpoint source pollution.
- DACS may develop and adopt by rule interim measure, BMPs, or other measures necessary for agricultural pollutant sources to achieve their load reduction allocations.
  - These measures may be implemented by those responsible for agricultural pollutant sources. **DEP, the WMDs, and DACS** shall assist with implementation.
  - In developing and adopting these measures, DACS shall consult with DEP, DOH, the WMDs, representatives of affected farming groups, and environmental group representatives.
  - The rules shall provide for a notice of intent to implement the practices and a system to ensure implementation, including recordkeeping.
- Verification of Effectiveness and Presumption of Compliance -
  - DEP shall, at representative sites, verify the effectiveness of BMPs and other measures adopted by rule in achieving load reduction allocations.
  - DEP shall use best professional judgment in making the initial verification of effectiveness, and shall notify **DACS and the appropriate WMD** of the initial verification prior to the adoption of a rule proposed pursuant to this paragraph.
  - Implementation of rule-adopted BMPs or other measures initially verified by DEP to be effective, or verified to be effective by monitoring at representative sites, provides a presumption of compliance with state water quality standards for those pollutants addressed by the practices.
- Reevaluation –
  - Where water quality problems are demonstrated despite implementation, operation, and maintenance of rule-adopted BMPs and other measures, **DEP, a WMD, or DACS**, in consultation with DEP, shall reevaluate the measures. If the practices require modification, the revised rule shall specify a reasonable time period for implementation.

APPENDIX C: STAKEHOLDER INVOLVEMENT IN BMAP DEVELOPMENT

LAKES HARNEY AND MONROE AND MSJR BMAP STAKEHOLDER INVOLVEMENT

The stakeholders involved in the technical meetings provided valuable information during the BMAP process. The technical meetings began in October 2010 to organize and review the technical information that is the basis of the BMAP. The technical stakeholders also identified management actions to improve water quality in the watershed. The technical meetings were held regularly throughout the BMAP development process on the following dates:

- *October 21, 2010;*
- *November 18, 2010;*
- *January 20, 2011;*
- *April 21, 2011;*
- *July 21, 2011;*
- *September 15, 2011;*
- *October 20, 2011;*
- *December 15, 2011; and*
- *February 16, 2012.*

Policy briefings were also held throughout the BMAP process to obtain input on the BMAP components from allocation stakeholder policy makers and other interested stakeholders. Policy briefings were held on:

- *November 17, 2011; and*
- *March 15, 2012.*

PUBLIC PARTICIPATION IN MEETINGS

All technical meetings and policy briefings were open to the public and noticed in the *Florida Administrative Weekly* (FAW). Technical meetings were open to anyone interested in participating in the technical discussions.

PUBLIC MEETINGS

Public meetings on the proposed verified list and the Lakes Harney and Monroe and MSJR Basin TMDLs were held before each was adopted. In addition, a public workshop on the BMAP was held on April 19, 2012.

PLAN RECOMMENDATION APPROVAL AND ADOPTION

The final BMAP is to be adopted by FDEP Secretarial Order.

APPENDIX D: SUMMARY OF EPA-RECOMMENDED ELEMENTS OF A COMPREHENSIVE WATERSHED PLAN

The following is an excerpt on the nine elements of a watershed plan from the EPA's "Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters." Additional information regarding these elements can be found in the full version of the handbook located online at: http://www.epa.gov/owow/nps/watershed_handbook/.

NINE MINIMUM ELEMENTS TO BE INCLUDED IN A WATERSHED PLAN FOR IMPAIRED WATERS FUNDED USING INCREMENTAL SECTION 319 FUNDS

Although many different components may be included in a watershed plan, EPA has identified a minimum of nine elements that are critical for achieving improvements in water quality. EPA requires that these nine elements be addressed for watershed plans funded using incremental section 319 funds and strongly recommends that they be included in all other watershed plans that are intended to remediate water quality impairments.

The nine elements are provided below, listed in the order in which they appear in the guidelines. Although they are listed as *a* through *i*, they do not necessarily take place sequentially. For example, element *d* asks for a description of the technical and financial assistance that will be needed to implement the watershed plan, but this can be done only after you have addressed elements *e* and *i*.

Explanations are provided with each element to show you what to include in your watershed plan.

NINE ELEMENTS

a. Identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed plan. Sources that need to be controlled should be identified at the significant subcategory level along with estimates of the extent to which they are present in the watershed (e.g., X number of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility; Y acres of row crops needing improved nutrient management or sediment control; or Z linear miles of eroded streambank needing remediation).

What does this mean?
Your watershed plan should include a map of the watershed that locates the major sources and causes of impairment. Based on these impairments, you will set goals that will include (at a minimum) meeting the appropriate water quality standards for pollutants that threaten or impair the physical, chemical, or biological integrity of the watershed covered in the plan.

b. An estimate of the load reductions expected from management measures.

What does this mean?
You will first quantify the pollutant loads for the watershed. Based on these pollutant loads, you'll determine the reductions needed to meet the water quality standards.

You will then identify various management measures (see element *c* below) that will help to reduce the pollutant loads and estimate the load reductions expected as a result of these

management measures to be implemented, recognizing the difficulty in precisely predicting the performance of management measures over time.

Estimates should be provided at the same level as that required in the scale and scope component in paragraph *a* (e.g., the total load reduction expected for dairy cattle feedlots, row crops, or eroded streambanks). For waters for which EPA has approved or established TMDLs, the plan should identify and incorporate the TMDLs.

Applicable loads for downstream waters should be included so that water delivered to a downstream or adjacent segment does not exceed the water quality standards for the pollutant of concern at the water segment boundary. The estimate should account for reductions in pollutant loads from point and nonpoint sources identified in the TMDL as necessary to attain the applicable water quality standards.

c. A description of the nonpoint source management measures that will need to be implemented to achieve load reductions in paragraph 2, and a description of the critical areas in which those measures will be needed to implement this plan.

What does this mean?
The plan should describe the management measures that need to be implemented to achieve the load reductions estimated under element *b*, as well as to achieve any additional pollution prevention goals called out in the watershed plan. It should also identify the critical areas in which those measures will be needed to implement the plan. This can be done by using a map or a description.

d. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan.

What does this mean?
You should estimate the financial and technical assistance needed to implement the entire plan. This includes implementation and long-term operation and maintenance of management measures, I/E activities, monitoring, and evaluation activities. You should also document which relevant authorities might play a role in implementing the plan. Plan sponsors should consider the use of federal, state, local, and private funds or resources that might be available to assist in implementing the plan. Shortfalls between needs and available resources should be identified and addressed in the plan.

e. An information and education component used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

What does this mean?
The plan should include an I/E component that identifies the education and outreach activities or actions that will be used to implement the plan. These I/E activities may support the adoption and long-term operation and maintenance of management practices and support stakeholder involvement efforts.

f. Schedule for implementing the nonpoint source management measures identified in this plan that is reasonably expeditious.

What does this mean?
You need to include a schedule for implementing the management measures outlined in your watershed plan. The schedule should reflect the milestones you develop in *g*.

g. A description of interim measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.

What does this mean?
You'll develop interim, measurable milestones to measure progress in implementing the management measures for your watershed plan. These milestones will measure the implementation of the management measures, such as whether they are being implemented on schedule, whereas element *h* (see below) will measure the effectiveness of the management measures, for example, by documenting improvements in water quality.

h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.

What does this mean?
Using the milestones you developed above, you'll develop a set of criteria (or indicators) with interim target values to be used to determine whether progress is being made toward reducing pollutant loads. These interim targets can be direct measurements (e.g., fecal coliform concentrations) or indirect indicators of load reduction (e.g., number of beach closings). You must also indicate how you'll determine whether the watershed plan needs to be revised if interim targets are not met and what process will be used to revise the existing management approach. Where a nonpoint source TMDL has been established, interim targets are also needed to determine whether the TMDL needs to be revised.

i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item h immediately above.

What does this mean?
The watershed plan must include a monitoring component to determine whether progress is being made toward attainment or maintenance of the applicable water quality standards. The monitoring program must be fully integrated with the established schedule and interim milestone criteria identified above. The monitoring component should be designed to determine whether loading reductions are being achieved over time and substantial progress in meeting water quality standards is being made. Watershed-scale monitoring can be used to measure the effects of multiple programs, projects, and trends over time. Instream monitoring does not have to be conducted for individual BMPs unless that type of monitoring is particularly relevant to the project.

APPENDIX E: PROJECTS TO ACHIEVE THE TMDL

The projects and timeframes for implementation submitted by the entities to achieve their TMDL allocations for the first iteration of the BMAP are summarized in the tables below. Additional reductions are expected to be necessary in future BMAP iterations to meet the loads specified in the TMDLs. The tables provide information on the nutrient reduction attributed to each individual project, shown in pounds per year (lbs/yr). These projects were submitted to provide reasonable assurance to FDEP that the entity has a plan on how they will meet their allocation; however, this list of projects is meant to be flexible enough to allow for changes that may occur over time, provided that the reduction is still met within the specified timeframe.

CITY OF DEBARY

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
DeBary	DB-1	Noncontributing Basin	Noncontributing basin, not included in the TMDL model	6,522.5	1,036.8
DeBary	DB-2	Noncontributing Basin	Noncontributing basin, not included in the TMDL model	7,039.2	1,170.2
DeBary	**N/A**	**N/A**	**Total Projects Reduction**	**13,561.7**	**2,207.0**
DeBary	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**1,880.2**	**86.4**
DeBary	**N/A**	**N/A**	**Credit for Future BMAPs**	**11,681.5**	**2,120.6**

CITY OF DELAND

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
DeLand	DL-1	Education Efforts	FYN, irrigation ordinance, fertilizer ordinance, pamphlets, website, illicit discharge program	9.1	0.7
DeLand	**N/A**	**N/A**	**Total Projects Reduction**	**9.1**	**0.7**
DeLand	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**0.0**	**0.0**
DeLand	**N/A**	**N/A**	**Credit for Future BMAPs**	**9.1**	**0.7**

CITY OF DELTONA

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	PROJECT COST	ANNUAL O&M	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Deltona	DEL-1	McGarity Kirkhill Regional Treatment Facility	Wet detention pond	Retrofit project to treat surface water runoff from a residential area in the city	277.2	$1,500,000	$50,000	09/2011	Completed	344.6	91.8
Deltona	DEL-2	DRA GC-5	Retention BMPs	Water quality treatment for a residential area	10.5	$120,000	$6,000	08/2009	Completed	25.5	4.3
Deltona	DEL-3	Swales	Swales	Swales throughout the city	2,368.7	$2,000,000	$100,000	Varies	Completed	4,820.2	728.6
Deltona	DEL-4	Lake Gleason Control Structure	Wet detention pond	Proposed control structure to increase storage in Lake Gleason	581.6	$150,000	$3,000	Unknown	Construction	672.0	188.4
Deltona	DEL-5	Education Efforts	Education	FYN, irrigation ordinance, pet waste ordinance, PSAs, pamphlets, website, illicit discharge program	N/A	Unknown	Unknown	Ongoing	Ongoing	1,270.0	206.4
Deltona	DEL-6	Catch Basin Maintenance	Catch basin cleanout	Catch basin cleanout throughout the city	N/A	Unknown	Unknown	Ongoing	Ongoing	19.1	10.4
Deltona	**N/A**	**N/A**	**N/A**	**Total Projects Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**7,151.3**	**1,229.9**
Deltona	**N/A**	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**3,608.7**	**388.3**
Deltona	**N/A**	**N/A**	**N/A**	**Credit for Future BMAPs**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**3,542.6**	**814.6**

CITY OF LAKE HELEN

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Lake Helen	LH-1	Education Efforts	Irrigation ordinance, pet waste ordinance, pamphlets, website	30.8	4.5
Lake Helen	**N/A**	**N/A**	**Total Projects Reduction**	**30.8**	**4.5**
Lake Helen	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**0.0**	**0.0**
Lake Helen	**N/A**	**N/A**	**Credit for Future BMAPs**	**30.8**	**4.5**

CITY OF LAKE MARY

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Lake Mary	LM-1	Education Efforts	FYN, landscape ordinance, irrigation ordinance, pet waste ordinance, PSAs, pamphlets, website, illicit discharge program	361.5	52.2
Lake Mary	LM-2	Street Sweeping	Sweeping of 53.58 curb miles per year	9.6	6.4
Lake Mary	**N/A**	**N/A**	**Total Projects Reduction**	**371.0**	**58.6**
Lake Mary	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**0.0**	**0.0**
Lake Mary	**N/A**	**N/A**	**Credit for Future BMAPs**	**371.0**	**58.6**

CITY OF ORANGE CITY

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Orange City	OC-1	Education Efforts	Irrigation ordinance, pamphlets, website, illicit discharge program	1.3	0.2
Orange City	**N/A**	**N/A**	**Total Projects Reduction**	**1.3**	**0.2**
Orange City	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**0.0**	**0.0**
Orange City	**N/A**	**N/A**	**Credit for Future BMAPs**	**1.3**	**0.2**

CITY OF SANFORD

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Sanford	S-1	Cloud Branch Phase I	Wet detention pond	Drainage/water quality improvements	187.0	$3,491,375	05/2007	Completed	647.3	173.9
Sanford	S-2	Cloud Branch Phase II	Wet detention pond	Drainage/water quality improvements	379.7	$3,072,693	05/2007	Completed	1,390.1	405.6
Sanford	S-3	Street Sweeping	Street sweeping	Street sweeping throughout the city	N/A	Unknown	Ongoing	Ongoing	8,866.5	3,993.3
Sanford	S-4	Education Efforts	Education	FYN, landscaping ordinance, irrigation ordinance, PSAs, pamphlets, website, illicit discharge program	N/A	Unknown	Ongoing	Ongoing	2,069.9	324.5
Sanford	**N/A**	**N/A**	**N/A**	**Total Projects Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**12,973.9**	**4,897.3**
Sanford	**N/A**	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**10,360.0**	**1,339.6**
Sanford	**N/A**	**N/A**	**N/A**	**Credit for Future BMAPs**	**N/A**	**N/A**	**N/A**	**N/A**	**2,613.9**	**3,557.7**

FDOT

Entity	Project Number	Project Name	Project Type	Treatment Acres	Start Date	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
FDOT	FDOT-1	79070-3547-02 (Pond 2)	Wet detention pond	21.6	N/A	6/2007	Completed	19.7	2.2
FDOT	FDOT-2	79070-3547-03 (Pond 3)	Wet detention pond	24.9	N/A	6/2007	Completed	11.7	0.6
FDOT	FDOT-3	79070-3547-04 (Pond 4)	Wet detention pond	35.2	N/A	6/2007	Completed	15.8	0.8
FDOT	FDOT-4	79070-3547-06 (Pond 6)	Wet detention pond	18.8	N/A	6/2007	Completed	13.6	0.7
FDOT	FDOT-5	79070-3546-03 (Pond 9)	Wet detention pond	13.4	N/A	6/2007	Completed	13.3	8.6
FDOT	FDOT-6	79070-3546-02 (Pond 8)	Wet detention pond	44.3	N/A	6/2007	Completed	25.4	6.2
FDOT	FDOT-7	79070-3547-05 (Pond 5)	Wet detention pond	33.1	N/A	6/2007	Completed	25.2	2.7
FDOT	FDOT-8	79070-3546-01 (Pond 7)	Wet detention pond	26.9	N/A	6/2007	Completed	19.9	1.4
FDOT	FDOT-9	79070-3546-04 (Pond 10)	Wet detention pond	3.6	N/A	6/2007	Completed	3.8	2.7
FDOT	FDOT-10	79110-xxx3-08 (Pond 4)	Wet detention pond	8.4	N/A	10/2008	Completed	8.2	1.6
FDOT	FDOT-11	79110-xxx3-09 (Pond 5)	Wet detention pond	22.6	N/A	10/2008	Completed	27.2	6.2
FDOT	FDOT-12	79110-xxx3-10 (Pond 6)	Wet detention pond	10.7	N/A	10/2008	Completed	13.6	2.8
FDOT	FDOT-13	79110-xxx3-11 (Pond 7)	Wet detention pond	30.0	N/A	10/2008	Completed	38.3	7.7
FDOT	FDOT-14	79110-xxx4-01 & 02 (Pond 1 & 1A)	Wet detention pond	35.6	N/A	Unknown	Completed	54.4	11.0
FDOT	FDOT-15	79110-xxx4-03 & 04 (Pond 2 & 2A)	Wet detention pond	38.7	N/A	Unknown	Completed	65.3	13.3
FDOT	FDOT-16	79110-xxx4-05 (Pond 14)	Wet detention pond	24.5	N/A	Unknown	Completed	43.8	8.0
FDOT	FDOT-17	SR 415 - missing from model	Swales	133.9	N/A	Unknown	Completed	90.1	28.3
FDOT	FDOT-18	SR 44 - missing from model	Swales	43.5	N/A	Unknown	Completed	34.1	10.5
FDOT	FDOT-19	SR 46 - missing from model	Swales	48.2	N/A	Unknown	Completed	32.8	7.4
FDOT	FDOT-20	77160-3404-02 (Pond 1-NW)	Retention BMPs	25.5	N/A	05/2004	Completed	94.2	13.4
FDOT	FDOT-21	77160-3404-06 (Pond 4-11)	Wet detention pond	38.5	N/A	05/2004	Completed	102.5	24.4
FDOT	FDOT-22	77160-3404-05 (Pond 4-1)	Wet detention pond	32.4	N/A	05/2004	Completed	44.9	12.4
FDOT	FDOT-23	77160-3404-07 (Pond 5)	Wet detention pond	30.5	N/A	05/2004	Completed	47.4	8.6
FDOT	FDOT-24	77160-3436	Swales	56.5	N/A	Unknown	Completed	147.5	19.8
FDOT	FDOT-25	77160-3439-01 (Pond 1)	Wet detention pond	20.3	N/A	00/2006	Completed	7.4	0.7
FDOT	FDOT-26	79110-3404-04 & 05 (Pond QQ3 & QQ-5)	Wet detention pond	47.6	N/A	10/2004	Completed	56.4	11.7
FDOT	FDOT-27	79110-3404-06 (RR-3)	Wet detention pond	53.1	N/A	10/2004	Completed	68.1	16.9
FDOT	FDOT-28	79110-3404-07 (Pond SS-2)	Wet detention pond	87.5	N/A	02/2006	Completed	91.9	26.3
FDOT	FDOT-29	Roadside Swale	Swales	35.0	N/A	10/2004	Completed	93.8	13.5
FDOT	FDOT-30	Roadside swale	Swales	13.3	N/A	02/2006	Completed	39.5	5.7
FDOT	FDOT-31	SR 415 - missing from model	Swales	65.1	N/A	Unknown	Completed	39.1	8.5
FDOT	FDOT-32	Education Efforts	Education	N/A	N/A	Ongoing	Ongoing	101.1	13.3
FDOT	FDOT-33	Street Sweeping	Street sweeping	N/A	N/A	Ongoing	Ongoing	1,326.7	849.1
FDOT	FDOT-34	Noncontributing Area in DeBary	Noncontributing area	39.2	N/A	N/A	N/A	194.9	27.9
FDOT	FDOT-35	Noncontributing Area in Volusia County	Noncontributing area	22.7	N/A	N/A	N/A	117.6	19.0
FDOT	FDOT-36	SR 415 – Pond A	Wet detention pond	4.3	2012	Unknown	Planned, Funded	6.8	1.5
FDOT	FDOT-37	SR 415 – Pond B	Wet detention pond	8.5	2012	Unknown	Planned, Funded	7.9	0.8
FDOT	FDOT-38	SR 415 – Exfiltration Trench	Retention BMPs	22.0	2012	Unknown	Planned, Funded	11.6	0.4

Entity	Project Number	Project Name	Project Type	Treatment Acres	Start Date	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
FDOT	FDOT-39	SR 415 – Pond H	Wet detention pond	9.9	2012	Unknown	Planned, Funded	10.2	2.4
FDOT	FDOT-40	SR 44 – Pond 1	Wet detention pond	18.0	2012	Unknown	Planned, Funded	25.8	6.3
FDOT	FDOT-41	SR 44 – Pond 2	Wet detention pond	11.6	2012	Unknown	Planned, Funded	18.8	5.4
FDOT	**N/A**	**N/A**	**Total Projects Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**3,210.7**	**1,210.7**
FDOT	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**1,231.8**	**0.0**
FDOT	**N/A**	**N/A**	**Credit for Future BMAPs**	**N/A**	**N/A**	**N/A**	**N/A**	**1,978.9**	**1,210.7**

SEMINOLE COUNTY

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	PROJECT COST	ANNUAL O&M	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Seminole County	SC-1	Club II Regional Stormwater Facility (RSF)	Wet detention pond	RSF to collect and treat stormwater runoff	422.7	$2,334,682	$20,095	02/2007	Completed	1,333.3	395.6
Seminole County	SC-2	Midway RSF	Wet detention pond	RSF to collect and treat stormwater runoff	121.8	$2,163,151	$26,662	01/2009	Completed	408.4	118.4
Seminole County	SC-3	Elder Creek RSF	Wet detention pond	RSF to collect and treat stormwater runoff	229.7	$3,884,496	$19,251	11/2007	Completed	519.2	134.4
Seminole County	SC-4	Lockhart-Smith RSF	Wet detention pond	RSF to collect and treat stormwater runoff	2,757.0	$3,504,755	Unknown	01/2007	Completed	3,201.1	840.1
Seminole County	SC-5	Street Sweeping	Street sweeping	Street sweeping throughout the county	N/A	Unknown	Unknown	Ongoing	Ongoing	300.0	135.1
Seminole County	SC-6	Education Efforts	Education	FYN, landscaping ordinance, irrigation ordinance, pet waste ordinance, PSAs, pamphlets, website, illicit discharge program	N/A	Unknown	Unknown	Ongoing	Ongoing	1,875.8	282.3
Seminole County	**N/A**	**N/A**	**N/A**	**Total Projects Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**7,637.8**	**1,905.9**
Seminole County	**N/A**	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**3,973.6**	**155.5**
Seminole County	**N/A**	**N/A**	**N/A**	**Credit for Future BMAPs**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**3,664.2**	**1,750.4**

TURNPIKE AUTHORITY

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Turnpike Authority	T-1	Street Sweeping	Sweep 120 lane miles per year	21.6	14.4
Turnpike Authority	**N/A**	**N/A**	**Total Projects Reduction**	**21.6**	**14.4**
Turnpike Authority	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**0.0**	**0.0**
Turnpike Authority	**N/A**	**N/A**	**Credit for Future BMAPs**	**21.6**	**14.4**

VOLUSIA COUNTY

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Volusia County	VC-1	Education and Outreach	Education	N/A	Unknown	Ongoing	Ongoing	1,391.9	201.0
Volusia County	VC-2	Street Sweeping	Street sweeping	N/A	Unknown	Ongoing	Ongoing	115.5	52.0
Volusia County	VC-3	Lemon Bluff Road	Swales	1.8	$145,000	2011	Completed	6.6	1.1
Volusia County	VC-4	Lemon Bluff Boat Ramp	Swales	0.2	$55,550	02/2011	Completed	0.7	0.1
Volusia County	VC-5	DeBary Avenue – Doyle Road Expansion	Wet detention pond	123.3	Unknown	Unknown	Completed	41.0	10.3
Volusia County	VC-6	Lake Winnemissett Noncontributing Basin	Noncontributing basin	1003.3	N/A	N/A	N/A	657.9	93.8
Volusia County	**N/A**	**N/A**	**Total Projects Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**2,213.6**	**358.3**
Volusia County	**N/A**	**N/A**	**Total BMAP 1 Required Reduction**	**N/A**	**N/A**	**N/A**	**N/A**	**1,632.9**	**0**
Volusia County	**N/A**	**N/A**	**Credit for Future BMAPs**	**N/A**	**N/A**	**N/A**	**N/A**	**580.7**	**358.3**

APPENDIX F: GLOSSARY OF TERMS

303(d) List: The list of Florida's waterbodies that do not meet or are not expected to meet applicable water quality standards with technology-based controls alone.

305(b) Report: Section 305(b) of the federal Clean Water Act requires states to report biennially to the EPA on the quality of the waters in the state.

Background: The condition of waters in the absence of human-induced alterations.

Baffle box: An underground stormwater management device that uses barriers (or baffles) to slow the flow of untreated stormwater, allowing particulates to settle out in the box before the stormwater is released into the environment.

Baseline loading: The quantity of pollutants in a waterbody, used as a basis for later comparison.

Basin Management Action Plan (BMAP): The document that describes how a specific TMDL will be implemented; the plan describes the specific load and wasteload allocations as well as the stakeholder efforts that will be undertaken to achieve an adopted TMDL.

Basin Status Report: For the MSJR Basin, this document was published in 2003 by FDEP. The report documents the water quality issues, list of water segments under consideration for a TMDL and data needs in the basin.

Best Available Technology (BAT) Economically Achievable: As defined by 40 CFR, §125.3, outlines technology-based treatment requirements in permits.

Best Management Practices (BMPs): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

Clean Water Act (CWA): The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the United States.

Continuous deflective separation (CDS) Unit: A patented stormwater management device that uses the available energy of the storm flow to create a vortex to cause a separation of solids from fluids. Pollutants are captured inside the separation chamber, while the water passes out through the separation screen.

Designated use: Uses specified in water quality standards for each waterbody or segment (such as drinking water, swimmable, fishable).

Detention Pond: A stormwater system that delays the downstream progress of stormwater runoff in a controlled manner, typically by using temporary storage areas and a metered outlet device.

Domestic Wastewater: Wastewater derived principally from dwellings, business buildings, institutions and the like; sanitary wastewater; sewage.

Effluent: Wastewater that flows into a receiving stream by way of a domestic or industrial discharge point.

Environmental Protection Agency (EPA): The agency was created in December 1970 to address the nation's urgent environmental problems and to protect the public health. The majority of FDEP's regulatory programs has counterparts at the EPA or is delegated from the EPA.

Event mean concentration: The flow-weighted mean concentration of an urban runoff pollutant measured during a storm event.

Exfiltration: Loss of water from a drainage system as the result of percolation or absorption into the surrounding soil.

External loading: Pollutants originating from outside a waterbody that contribute to the pollutant load of the waterbody.

Flocculent: A liquid that contains loosely aggregated, suspended particles.

Florida Department of Environmental Protection (FDEP): FDEP is Florida's principal environmental and natural resources agency. The Florida Department of Natural Resources and the Florida Department of Environmental Regulation were merged together to create FDEP effective July 1, 1993.

Ground Water or Groundwater: Water below the land surface in the zone of saturation where water is at or above atmospheric pressure.

Impairment: The condition of a waterbody that does not achieve water quality standards (designated use) due to pollutants or an unknown cause.

Load Allocations (LA): The portions of a receiving water's loading capacity that are allocated to one of its existing or future nonpoint sources of pollution.

Load Capacity: The greatest amount of loading that a waterbody can receive without violating water quality standards.

Loading: The total quantity of pollutants in stormwater runoff that contributes to the water quality impairment.

Margin of safety (MOS): An explicit or implicit assumption used in the calculation of a TMDL, which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. An explicit MOS is typically a percentage of the assimilative capacity or some other specific amount of pollutant loading (e.g., the loading from an out-of-state source). Most FDEP-adopted TMDLs include an implicit MOS based on the fact that the predictive model runs incorporate a variety of conservative assumptions (they examine worst-case ambient flow conditions, worst-case temperature, and assume that all permitted point sources discharge at their maximum permittable amount).

National Pollutant Discharge Elimination System (NPDES): The permitting process by which technology based and water quality–based controls are implemented.

Nonpoint Source (NPS): Diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground water. NPS includes atmospheric deposition and runoff or leaching from agricultural lands, urban areas, unvegetated lands, OSTDS, and construction sites.

Nonpoint Source Pollution: Nonpoint source pollution is created by the flushing of pollutants from the landscape by rainfall and the resulting stormwater runoff, or by the leaching of pollutants through the soils into the ground water.

Outfall: The place where a sewer, drain, or stream discharges.

Particulate: A minute separate particle, as of a granular substance or powder.

Pollutant Load Reduction Goals (PLRGs): PLRGs are defined as the estimated numeric reductions in pollutant loadings needed to preserve or restore designated uses of receiving waterbodies and maintain water quality consistent with applicable state water quality standards. PLRGs are developed by the water management districts.

Point Source: An identifiable and confined discharge point for one or more water pollutants, such as a pipe, channel, vessel, or ditch.

Pollutant: Generally any substance, such as a chemical or waste product, introduced into the environment that adversely affects the usefulness of a resource.

Pollution: An undesirable change in the physical, chemical, or biological characteristics of air, water, soil, or food that can adversely affect the health, survival, or activities of humans or other living organisms.

Removal efficiency: A description of how much of a given substance (metals, sediment, etc.) has been extracted from another substance.

Retention Pond: A stormwater management structure whose primary purpose is to permanently store a given volume of stormwater runoff, releasing it by infiltration and /or evaporation.

Reuse: The deliberate application of reclaimed water for a beneficial purpose. Criteria used to classify projects as “reuse” or “effluent disposal” are contained in Subsection 62-610.810, F.A.C.

Quality Assurance (QA): An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, product, or service meets defined standards of quality.

Quality Control (QC): The overall system of technical activities that measures the attributes and performance of a process, product, or service against defined standards to verify that they meet the established data quality objectives.

Septic Tank: A watertight receptacle constructed to promote the separation of solid and liquid components of wastewater, to provide the limited digestion of organic matter, to store solids, and to allow clarified liquid to discharge for further treatment and disposal in a soil absorption system.

STORET: The EPA's STOrage and RETrieval database, used nationally for water quality data storage.

Stormwater runoff: The portion of rainfall that hits the ground and is not evaporated, percolated, or transpired into vegetation, but rather flows over the ground surface seeking a receiving water body.

Surface Water: Water on the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs is classified as surface water when it exits the spring onto the earth's surface.

Surface Water Improvement and Management (SWIM) Waterbody: A waterbody designated by statute or by a water management district for priority management to restore and maintain water quality, habitat, and other natural features of the waterbody. The MSJR Basin has this special designation.

Total Maximum Daily Load (TMDL): The sum of the individual wasteload allocations for point sources and the load allocations for nonpoint sources and natural background. Prior to determining individual wasteload allocations and load allocations, the maximum amount of a pollutant that a waterbody or waterbody segment can assimilate from all sources while still maintaining its designated use must first be calculated. TMDLs are based on the relationship between pollutants and instream water quality conditions.

Wasteload Allocations (WLAs): Pollutant loads allotted to existing and future point sources, such as discharges from industry and sewage facilities.

Wastewater: The combination of liquid and pollutants from residences, commercial buildings, industrial plants, and institutions, together with any ground water, surface runoff, or leachate that may be present.

Waterbody Identification (WBID) Numbers: WBIDs are numbers assigned to hydrologically based drainage areas in a river basin.

Water Quality Standards (WQSs): (1) Standards that comprise the designated most beneficial uses (classification of water), the numeric and narrative criteria applied to the specific water use or classification, the Florida Anti-degradation Policy, and the moderating provisions contained in Rules 62-302 and 62-4, F.A.C. (2) State-adopted and EPA-approved ambient standards for waterbodies. The standards prescribe the use of the waterbody (such as drinking, fishing and swimming, and shellfish harvesting) and establish the water quality criteria that must be met to protect designated uses.

Watershed: Topographic area that contributes or may contribute runoff to specific surface waters or an area of recharge.

Watershed management approach: The process of addressing water quality concerns within their natural boundaries, rather than political or regulatory boundaries. The process draws together all the participants and stakeholders in each basin to decide what problems affect the water quality in the basin, which are most important, and how they will be addressed.

APPENDIX G: BIBLIOGRAPHY OF KEY REFERENCES AND WEBSITES

REFERENCES:

Florida Department of Environmental Protection.

- 2003. *Basin Status Report: Middle St. Johns.*
- 2005. *Water Quality Assessment Report: Middle St. Johns*.
- 2009a. *Final TMDL Report: Nutrient and Dissolved Oxygen TMDLs for the Six Middle St. Johns River Segments between the Inlet of Lake Harney (WBID 2964A) and St. Johns River above Wekiva River (WBID 2893C).*
- 2009b. *Final TMDL Report: Dissolved Oxygen TMDL for Smith Canal (WBID 2962).*

WEBSITES:

TABLE G-1: STORMWATER AND WATER QUALITY PROTECTION WEBSITES

LOCAL AND REGIONAL SITES	
SJRWMD Programs *Outreach information*	http://sjr.state.fl.us/programs/programs.html http://sjr.state.fl.us/programs/outreach/overview.html
Seminole County Water Atlas	http://www.seminole.wateratlas.usf.edu/
STATE SITES	
General Portal for Florida	http://www.myflorida.com
FDEP *Watershed Management* *TMDL Program* *BMPs, public information,* *NPDES Stormwater Program* *NPS funding assistance* *MSJR Basin Water Quality Assessment Report* *Adopted BMAPs*	http://www.dep.state.fl.us/ http://www.dep.state.fl.us/water/watersheds/index.htm http://www.dep.state.fl.us/water/tmdl/index.htm http://www.dep.state.fl.us/water/nonpoint/pubs.htm http://www.dep.state.fl.us/water/stormwater/npdes/index.htm http://www.dep.state.fl.us/water/nonpoint/319h.htm http://www.dep.state.fl.us/water/basin411/sj_middle/assessment.htm http://www.dep.state.fl.us/water/watersheds/bmap.htm
FDACS Office of Agricultural Water Policy	http://www.floridaagwaterpolicy.com/
NATIONAL SITES	
Center for Watershed Protection	http://www.cwp.org/
US EPA Office of Water *EPA Region 4 (SE US)* *Clean Water Act history*	http://www.epa.gov/water http://www.epa.gov/region4 http://www.epa.gov/Region5/water/cwa.htm
United States Geological Survey: Florida Waters	http://sofia.usgs.gov/publications/reports/floridawaters/#options